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AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**

(Supplement 151)

FEBRUARY 1976

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 151)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in January 1976 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*



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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 195 reports, articles and other documents announced during January 1976 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections—*IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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An annual index will be prepared at the end of the calendar year covering all documents listed in the 1976 Supplements.

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TABLE OF CONTENTS

	Page
IAA Entries (A76-10000).....	1
STAR Entries(N76-10000).....	13
Subject Index.....	I-1
Personal Author Index.....	I-19

TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT		AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER	N76-10706*	TECHTRAN CORP., SILVER SPRING, MD
TITLE	X-RAY INVESTIGATION IN AVIATION AND SPACE MEDICINE	CORPORATE SOURCE
AUTHOR	A R Mansurov Washington NASA Oct 1975 91 p refs Transl into ENGLISH of the book Tashkent USSR, Meditsina Press, 1971 p 1-166	PUBLICATION DATE
CONTRACT OR GRANT	(Contract NASw-2485)	AVAILABILITY SOURCE
REPORT NUMBER	(NASA-TT-F-804) Avail NTIS HC \$4.75 CSCL 06S	COSATI CODE
	<p>The history of the use of X-rays to study the effects produced in animals and man by g-forces oriented in various directions is presented with reference of Soviet and foreign literature. Frequent comparisons are drawn between the effects on unprotected organisms and parts of the body and the same effects ameliorated by the use of pressurized clothing and special g-suits. Data drawn from examinations of professional aviators and parachute jumpers are employed in a survey placing special emphasis on spinal changes and damage caused by landing after ejection or making a jump.</p> <p style="text-align: right;">Author</p>	

TYPICAL CITATION AND ABSTRACT FROM IAA

NASA SPONSORED DOCUMENT		TITLE
IAA ACCESSION NUMBER	A76-10720*	Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation D L
AUTHOR'S AFFILIATION	Mattson (San Jose State University, San Jose, Calif.)	AUTHOR
CONTRACT, GRANT OR SPONSORSHIP	Grant No. NGL-05-046-002	TITLE OF PERIODICAL
	Experimental Psychology, vol 1, Nov 1975, p 404-410 23 refs	PUBLICATION DATE
	<p>The effect of prolonged angular acceleration on choice reaction time to an accelerating visual stimulus was investigated, with 10 commercial airline pilots serving as subjects. The pattern of reaction times during and following acceleration was compared with the pattern of velocity estimates reported during identical trials. Both reaction times and velocity estimates increased at the onset of acceleration, declined prior to the termination of acceleration, and showed an aftereffect. These results are inconsistent with the torsion-pendulum theory of semicircular canal function and suggest that the vestibular adaptation is of central origin.</p> <p style="text-align: right;">(Author)</p>	

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 151)

FEBRUARY 1976

IAA ENTRIES

A76-10098 * Prostaglandin control of renal circulation in the unanesthetized dog and baboon J A Swain, S F Vatner (Harvard University, Peter Bent Brigham Hospital, Children's Hospital Medical Center, Boston, New England Regional Primate Research Center, Southborough, Mass), G R Heyndrickx, and D H Boettcher *American Journal of Physiology*, vol 229, Sept 1975, p 826-830 21 refs Research supported by the American Heart Association and NASA, Grants No PHS-HL-15416, No PHS-HL 17549, No PHS-HL-1043609

Effects of indomethacin and meclofenamate, inhibitors of prostaglandin synthesis, were evaluated in the regulation of renal blood flow in conscious and anesthetized dogs and in tranquilized baboons, instrumented with arterial pressure catheters and renal blood flow probes Indomethacin, 10 mg/kg, did not alter renal blood flow or resistance significantly in the conscious dog In the anesthetized dog, however, indomethacin caused a reduction in renal blood flow and an elevation of renal vascular resistance Meclofenamate, 4 mg/kg, reduced renal flow and increased renal vascular resistance in conscious dogs In conscious dogs and tranquilized primates, indomethacin and meclofenamate reduced the reactive hyperemia in the renal bed Methoxamine and angiotensin II infused in graded doses induced significantly greater renal vasoconstriction in conscious dogs in the presence of indomethacin Thus, in the conscious animal, prostaglandins appear to play only a minor part in the control of renal circulation at rest, but they are of greater importance in mediating the renal responses to reactive hyperemia and to vasoconstriction (Author)

A76-10303 # Radiation safety in space flights Radiobiological aspects (Radiatsionnaya bezopasnost' kosmicheskikh poletov Radiobiologicheskie aspekty) Iu G Grigor'ev Moscow, Atomizdat, 1975 256 p 549 refs In Russian

The radiation doses to which man in space can be exposed are discussed, and criteria for evaluating the radiation safety during space flights are proposed Data on the biological action of protons and heavy ions are reviewed, along with the results of radiobiological experiments performed in space The modifying influence environmental physical factors on the radiobiological effect is examined Means of protecting space crews from radiation are described V P

A76-10480 * Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal J H J Allum (MIT, Cambridge, Mass) *Experimental Brain Research*, vol 22, no 3, 1975, p 307-326 31 refs Grant No NGR-22-009-025

A76-10650 Cs-131 myocardial scintigraphy - Application to assessment of anterior myocardial infarction W Burguet, G Merchie, and H Kulbertus (Liege, Université, Liege, Belgium) *British Heart Journal*, vol 37, Oct 1975, p 1037-1044 21 refs

One hundred and ten cases with documented anterior myocardial infarction are studied by cesium-131 myocardial scintigraphy

in order to assess the potentials of this technique The clinical usefulness of the technique is discussed, and its suitability for semiquantitative evaluation of anterior necrotic lesions is stressed An index of necrosis is proposed from planimetric measurements of the infarcted area as compared to the total left ventricular surface in both the anteroposterior and left anterior oblique projections This index of necrosis is shown to correlate with the incidence of major complications following the acute episode of coronary occlusion The sensitivity, specificity, and accuracy of the technique are briefly discussed In order to visualize the intracardiac cavities, Cs 131 investigation is usually completed by an In-113m scintigram to be able to recognize parietal aneurism The results so far obtained are promising enough to justify further efforts in this field S D

A76-10718 On the relation between time and space in the visual discrimination of velocity J S Lappin, H H Bell, O J Harm, and B Kottas (Vanderbilt University, Nashville, Tenn) *Journal of Experimental Psychology*, vol 1, Nov 1975, p 383-394 22 refs Grant No PHS-MH-21105

Two experiments were conducted to verify whether perception of velocity is determined by prior discrimination of spatial and temporal distances, by comparing the discriminabilities of moving stimuli varied in spatial extent, temporal duration, or in redundant combinations of both variables The subject's task was to identify which of two alternative stimuli was presented on each trial A set of four stimuli was constructed from two values of spatial extent and two values of temporal duration Separate conditions required discrimination of each of the six possible pairs of these stimuli Experiment 1 examined continuous motion and Experiment 2 examined apparent motion for stimuli with short (50 vs 65 msec) and with long (500 vs 650 msec) interstimulus intervals With continuous motion and with good apparent motion (short intervals), the discrimination between the different-velocity bivariate pairs was too accurate to be attributed only to discriminations of the spatial and temporal extents of the motion This did not occur with poor apparent motion (Author)

A76-10719 Perception and extrapolation of velocity and acceleration D A Rosenbaum (Stanford University, Stanford, Calif) *Journal of Experimental Psychology*, vol 1, Nov 1975, p 395-403 8 refs

A moving target disappeared behind a screen and subjects predicted when the target passed behind a marker on the screen When the target moved with constant velocity, predictions were extremely accurate, regardless of the spatial and temporal exposure and concealment of the target and regardless of its rate of velocity When the target accelerated, accuracy of prediction decreased with increasing acceleration and with increasing target concealment Analyses of the results suggest that the perception of velocity and acceleration incorporates concrete and abstract characteristics of the motion that was seen It is proposed that the motion perception system is tuned to accelerated rather than to constant velocity movement (Author)

A76-10720 * Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation D L Mattson (San Jose State University, San Jose, Calif) *Journal of Experimental Psychology*, vol 1, Nov 1975, p 404-410 23 refs Grant No NGL-05-046-002

The effect of prolonged angular acceleration on choice reaction time to an accelerating visual stimulus was investigated, with 10 commercial airline pilots serving as subjects. The pattern of reaction times during and following acceleration was compared with the pattern of velocity estimates reported during identical trials. Both reaction times and velocity estimates increased at the onset of

A76-10808 # DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions (Sintez DNK v limfoidnykh organakh kryz pri adaptatsii k usloviyam vysokogor'ia) F T Guseinov, G S Komolova, I A Egorov, and V A Isabaeva (Akademii Nauk SSSR, Institut Biokhimii, Moscow, USSR) *Akademii Nauk SSSR, Doklady*, vol 223, Aug 1, 1975, p 1018, 1019 12 refs In Russian

A76-10809 # The dependence of the content and concentration of products of enzymatic oxidation on the size of coacervate droplets (Zavisimost' soderzhanii i kontsentratsii produktov fermentativnogo oksleniia ot razmerov koatservatnykh kapel') T V Mamontova, T N Evreinova, and Iu R Khrust (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Akademii Nauk SSSR, Doklady*, vol 223, Aug 1, 1975, p 1020-1022 7 refs In Russian

The oxidation of pyrogallol and o-dimethoxybenzidine by peroxidase in the presence of H₂O₂ was studied in protein-carbohydrate (histone-gum arabic) and protein-nuclein (histone-DNA) coacervate systems. Quantitative measurements of oxidation products in individual coacervate droplets were carried out using a probing scintillation spectrophotometer and a scanning integrating microphotometer. It was found that with increasing droplet size the content of oxidized substances increased, while their concentration decreased. The concentration of oxidized compounds was greater in DNA-histone droplets than in gum arabic-histone droplets of the same size. Equations describing the dependence of the concentration of individual oxidation products on droplet size are derived from analysis of the data C K D

A76-10823 Comments on fire toxicity R R Montgomery, C F Reinhardt, and J B Terrill (Du Pont de Nemours and Co, Inc, Wilmington, Del) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Aug 1975, p 179-212 83 refs

Factors identified as causes of death and incapacitation in fires are heat, either as direct burns or thermal shock, carbon monoxide, oxygen deficiency, thermal decomposition gases, smoke, and panic or trauma. Among these factors, two recent epidemiological surveys of fire fatalities identified carbon monoxide poisoning, smoke poisoning or asphyxia, and burns as principal causes of fire deaths. Test methods for evaluating fire toxicity are characterized as analytical, biological, a combination of these two, or predictive. The review includes data from laboratory experiments of these various types and also data from room and building fires. The need to put data into practical context or present it on a comparable basis with standard or natural materials is emphasized. Suggestions for future research are presented (Author)

A76-10824 Toxicity of decomposition products. K Sumi and Y Tsuchiya (National Research Council, Div of Building

Research, Ottawa, Canada). *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Aug 1975, p 213-225 40 refs

Studies on toxic decomposition products to provide an experimental basis for the possible restriction of materials that generate large amounts of harmful gases upon combustion are summarized. Results of several investigations of fire fatalities show that the majority are caused by inhalation of combustion products. Experiments to determine the toxicity of various combustion products and to identify the synergistic, additive, or antagonistic effects of certain combinations of toxic gases are described. Quantitative analyses of

pyrolysis products are discussed, and a method of evaluating the toxic hazard from experimental data is proposed. Fire regulations of various countries limiting the use of potentially toxic materials are outlined C K D

A76-10825 A bibliography of published information on combustion toxicology C J Hilado (San Francisco, University, San Francisco, Calif) and R P Chapman (California, University, Davis, Calif) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Aug 1975, p 244-261 241 refs

A76-10991 Absorption characteristics of multilayered sphere models exposed to UHF/microwave radiation C M Weil (U S Environmental Protection Agency, Experimental Biology Laboratory, Research Triangle Park, N C) *IEEE Transactions on Biomedical Engineering*, vol BME-22, Nov 1975, p 468-476 20 refs

The interaction of electromagnetic plane waves with multilayered spherical models composed of lossy dielectric media that represent different biological tissues found in human and animal heads is examined in the frequency range 0.1 to 10 GHz. The model ranges in size from 2 to 12.5 cm outer radius and consists of a core of brain-like material surrounded by five outer layers of CSF, bone, fat and skin-dura tissues. The absorption properties of the model have been analyzed throughout this range of size and frequency. The distribution of internally deposited energy has also been investigated in detail for three basic spheres of 3.3, 6 and 10 cm radii, with emphasis on the creation of localized regions of strong heating (hot-spots). Based on these results, some generalized conclusions are presented on the interaction of microwaves with different sized biological objects (Author)

A76-10997 Computation of the electromagnetic fields and induced temperatures within a model of the microwave-irradiated human eye A Taflovie (ITT Research Institute, Chicago, Ill) and M E Brodwin (Northwestern University, Evanston, Ill) *IEEE Transactions on Microwave Theory and Techniques*, vol MTT 23, Nov 1975, p 888-896 25 refs

A76-11064 Detection of a change in plant dynamics in a man-machine system R J Niemela (U S Army, Electronics Command, Fort Monmouth, N J) and E S Krendel (Pennsylvania, University, Philadelphia, Pa) *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-5, Nov 1975, p 615-617 10 refs

A description of the detection portion of a concise model of human operator adaptation in manually tracking a step change in polarity of double integral plant dynamics is presented. A general form of the detection boundaries in error state space was postulated based on examination of man-machine error trajectory responses. This form was corroborated by experimental data (Author)

A76-11138 * Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress. P C Sakellaris and J Vernikos-Danellis (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif) *Endocrinology*, vol 97, Sept. 1975, p 597-602 22 refs

The response and adaptation of the pituitary-adrenal system to chronic stresses was investigated. These included individual caging, confinement, and exposure to cold for varying periods of time. Studies were carried out demonstrating that during the period of adaptation when plasma corticosterone concentrations returned toward their prestress level despite continued exposure to the stressor, the animals responded to additional stimuli of ether for 1 min, a saline injection, or release from confinement with a faster increase (within 2.5 min) in plasma corticosterone than controls (10 min). It is concluded that during adaptation to a chronic stress the pituitary-adrenal system is not inhibited by the circulating steroid level but is actually hypersensitive to additional stimuli. (Author)

A76-11200 Frequency analyzer for EEG signals (Frequenzanalysator für EEG-Signale) H N Karp *Elektronik*, vol 24 Oct 1975, p 107-109 12 refs In German

The paper describes an EEG recording system that displays to the subject under investigation the time variation of his alpha waves and their frequency spectrum. This bio-feedback system is particularly suited for experiments in which test subjects exercise control over their alpha-wave generation. Block scheme and circuit diagram of the system are shown. The frequency range (7-14 MHz) is divided into seventeen channels. Tests showed that some subjects were able to control the amplitude of the EEG signals, but only when they could observe the display screen. P T H

A76-11238 # Reaction of erythrocytes and granulocytes in the peripheral blood of rate to hyperbaric oxygenation during oxygen deficiency in the organism (Reaktsiia eritrotsitov i granulotsitov perifericheskoi krovi krysa na giperbaricheskuiu oksigenatsiiu pri kislorodnoi nedostatochnosti organizma) Z G Tsagareli, E S Chertkova, and M A Dgebuadze (Akademiia Nauk Gruzinskoi SSR, Institut Eksperimental'noi Morfologii, Tiflis, Georgian SSR) *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol 79, Aug 1975, p 477-480. In Russian

A76-11376 # Computer-aided analysis of the probability characteristics of the brain biopotentials in healthy man (Analiz veroiatnostnykh kharakteristik biopotsentsialov golovnogo mozga zdorovogo cheloveka s pomoshch'iu elektronno-vychislitel'noi tekhniki) V I Kondratenko and A A Rybalov (Donetskii Meditsinskii Institut, Donetsk, USSR) *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol 25, July-Aug 1975, p 792-798 9 refs In Russian

A76-11377 # Dynamics of the skin-galvanic reflex for different stages and cycles of nighttime sleep (Dinamika kozhno-gal'vanicheskogo refleksa v razlichnykh stadiakh i tsiklakh nochnogo sna) V S Rotenberg, B I Kochubei, and V M Shakhnarovich (I Moskrovskii Meditsinskii Institut, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigieny, Moscow, USSR) *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol 25, July-Aug 1975, p 858-860 5 refs In Russian

A76-11419 Two-point fluorophotometer for the human ocular fundus C Riva and I Ben-Sira (Retina Foundation, Eye Research Institute, Boston, Mass) *Applied Optics*, vol 14, Nov 1975, p 2691-2693 5 refs Research supported by the Adler

Foundation and Massachusetts Lions Eye Research Fund, Grant No NIH-1-R01-EY-01242-01

A technique for making on-line recordings of fluorescein dilution curves from two locations in the human retina has been devised. A modified Zeiss fundus camera with two optical fibers mounted in a scanning ocular collects the light emitted by fluorescein dye from two spots in the fundus. Two fiber-optic cables transmit the collected light to a photomultiplier. The detector output current is transmitted to a two-channel pulse sorter. The output signals from the pulse sorter are amplified and displayed on a two-channel recorder. Since this technique utilizes only small amounts of fluorescein, multiple measurements in the same subject are possible. (Author)

A76-11449 Effects of age on responses to isometric exercise - Isometric handgrip in noninvasive screening for cardiovascular disease M Kino, V W Lance, A Shahamatpour, and D H Spodick (Lemuel Shattuck Hospital, Tufts University, Boston, Mass) *American Heart Journal*, vol 90, Nov 1975, p 575-581 42 refs Grant No NIH-HE-13608

A76-11450 Electrophysiology and pharmacology of cardiac arrhythmias IX - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage Part B A L Wit, B F Hoffman, and M R Rosen (Columbia University, New York, N Y) *American Heart Journal*, vol 90, Nov 1975, p 665-675 70 refs

A76-11451 # Dynamics of biped walk II (Dinamika dvunogoi khod'by II) V V Beletskii *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, July-Aug 1975, p 3-13 5 refs In Russian

Analytical solutions in closed form are obtained for several problems in which a biped system is simulated as a solid with two inertialess legs with many joints suspended at one point. The compensating motions of the body (balancer), the control moments in the leg joints, and the reactions of the suspension are determined from the given trajectory of the suspension point and the trail trajectory. V P

A76-11468 Aviation cardiology in Canada G W Manning (University Hospital, London, Ontario, Canada), R Thatcher, and I H Anderson (Canadian Armed Forces, Defence and Civil Institute of Environmental Medicine, Toronto, Department of National Health and Welfare, Civil Aviation Medicine Medical Services Branch, Ottawa, Canada) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 576-583 7 refs

A summary of military and civilian aspects of aviation cardiology in Canada is given. Electrocardiographic screening of applicants for military aircrew training is discussed, and procedures for the detection and review of existing or potential cases of cardiovascular disease in airmen are described. Preliminary results of a follow-up program of 5000 men who had routine ECGs during the Second World War indicate that first degree atrioventricular block does not increase morbidity or mortality over that of the normal population and that primary T wave changes may indicate the presence of asymptomatic coronary heart disease. The evaluation of the cardiovascular fitness of applicants for civil aviation licenses is outlined, and the guidelines used in granting licenses when cardiovascular problems exist are presented. The risk of civil aviation accidents due to cardiovascular problems is discussed. C K D

A76-11469 Operational aspects of pilot incapacitation in a multicrew airliner H W Orlady (United Air Lines, Inc., Chicago, Ill.) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D.C., Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 584-588 12 refs

The risks due to obvious or subtle (not immediately apparent to crew members) pilot incapacitation during critical flight stages were studied in simulated incidents in DC-8 and B-737 aircraft. The studies revealed three critical tasks for airline crews dealing with an incapacitation: maintaining control of the aircraft, caring for the incapacitated crew member, and reorganizing the cockpit and landing. Effective transfer of control was achieved by crews with no previous training in less than 5 seconds in 93% of the simulated incidents. There were wide variations in crew performance in caring for the incapacitated member. Reorganization of the cockpit was not a problem. It is suggested that air crews receive training in the recognition of subtle incapacitation and in coping with the incapacitated pilot. Such training might permit conservative modifications of medical standards while attaining a reduction of operational risk. C K D

A76-11470 On experts and expertise - The effect of variability in observer performance D H Spodick (Lemuel Shattuck Hospital, Boston, Mass.) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D.C., Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 592-596 16 refs

Variation in the performance of cardiology experts is dependent upon quantity and quality of the available data, but is also a function of two personal factors: perception and interpretation of data. Comparisons of expert interpretations of electrocardiograms and vectorcardiograms made with and without biasing information demonstrate wide divergence of opinion. Two controlled perception trials involving recognized cardiology experts produced similar results. It is suggested that biases in data acquisition and interpretation be minimized as far as possible by standardization of evaluation protocols and that multi-observer controlled trials of diagnostic methods be conducted to reveal the level of built-in discrepancies. C K D

A76-11471 Identification of ischemic heart disease Mr Ellestad (Memorial Hospital Center, Long Beach, Calif.), Mr Fox (George Washington University, Bethesda, Md.), Mr Bruce, Mr Dodge (Washington University, Seattle, Wash.), Mr Gensini (St Joseph's Hospital, Syracuse, N.Y.), Mr Humphries (Johns Hopkins University, Baltimore, Md.), Mr Kannel (National Heart Institute, Framingham, Mass.), Mr Levy (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.), Mr Mankin (Mayo Clinic, Rochester, Minn.), and Mr McHenry (Indiana University, Indianapolis, Ind.) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D.C., Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 597-608 33 refs

The construction of cardiovascular risk profiles for asymptomatic individuals is discussed, together with the use of resting and exercise electrocardiograms to identify cardiovascular conditions presenting a potential hazard. The evaluation procedures currently required for pilots of different classes are summarized. Criteria for qualifying persons beginning or continuing an aviation career are proposed. Procedures are recommended for the initial evaluation and periodic follow-up of the cardiovascular health of pilots. C K D

A76-11472 Recommendations for subjects with ischemic heart disease Mr Likoff (Hahnemann Medical College and Hospital, Philadelphia, Pa.), Mr Knoebel (Indiana University, Indianapolis, Ind.), Mr Amsterdam (California University, Davis, Calif.), Mr Frykholm (Aviation Medical Section, Montreal, Canada), Mr McMeekin (U.S. Armed Forces Institute of Pathology, Walter Reed Hospital, Washington, D.C.), Mr Roberts (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.), and Mr Morris (*American College of Cardiology, Bethesda Conference, 8th,*

Washington, D.C., Apr 25, 26, 1975) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 608, 609

Guidelines are recommended for the exercise of flexibility in the application of International Civil Aviation standards regarding ischemic heart disease. It is suggested that recertification of patients with ischemic heart disease be denied if coronary angiography indicates obstructive narrowing of two or more major coronary arteries, and that it be granted if the coronary arteries are normal. In other cases where there is coronary luminal narrowing, recertification should be withheld if there is other evidence of active myocardial ischemia. Persons with a history of myocardial infarction but with no evidence of current myocardial ischemia should not be considered for recertification until one year after the infarction. C K D

A76-11473 Hypertension Mr Gifford (Cleveland Clinic, Cleveland, Ohio), Mr Martz (Dow Chemical Co., Indianapolis, Ind.), Mr Carter (Mayo Clinic, Rochester, Minn.), Mr Berry (Texas University, Houston, Tex.), Mr Caris (U.S. Veterans Administration Hospital, San Antonio, Tex.), Mr Freis (U.S. Veterans Administration Hospital, Washington, D.C.), and Mr Hickler (Memorial Hospital, Worcester, Mass.) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D.C., Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 613-616 12 refs

Recommendations regarding the qualification of pilots with hypertension are presented. Risks permitted by the present regulations are judged to be acceptable, but it is suggested that serum cholesterol and glucose concentrations and smoking habits be included in the equation with blood pressure in determining fitness for flight. Guidelines are presented for the qualification of pilots whose hypertension has been surgically corrected or is controlled by antihypertensive drugs. Disqualifying evidence of target organ disease is summarized, and a method of monitoring hypertension in pilots is outlined. It is recommended that the same hypertension standards be applied to all classes of pilots. C K D

A76-11474 Valvular heart disease Mr Hall (Texas Heart Institute, Houston, Tex.), Mr Bristow (Oregon University, Portland, Ore.), Mr Hultgren (U.S. Veterans Administration Hospital, Palo Alto, Calif.), Mr Kouchoukos (Alabama University, Birmingham, Ala.), Mr McAllister (U.S. Armed Forces Institute of Pathology, Walter Reed Hospital, Washington, D.C.), and Mr Chetlin (*American College of Cardiology, Bethesda Conference, 8th, Washington, D.C., Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 617-620 30 refs

A procedure for detecting and evaluating valvular heart disease in qualified pilots and applicants for flight qualification is outlined. It is recommended that all acquired valvular heart disease be disqualifying on the initial examination for flight qualification, and that newly discovered and previously undocumented valvular abnormalities in certified flight personnel be disqualifying until their stability and severity have been determined by serial observation. Guidelines for continuing flight certification of personnel with mild aortic stenosis, mild aortic regurgitation, or mild mitral regurgitation are presented. C K D

A76-11475 * The capability of fluoroscopic systems to determine differential Roentgen-ray absorption N A Baily and R L Crepeau (California University, La Jolla, Calif.) *Radiology*, vol 115, May 1975, p 439-445 8 refs Grant No. NGL-05 009-103

A clinical fluoroscopic unit used in conjunction with a TV image digitization system was investigated to determine its capability to evaluate differential absorption between two areas in the same field. Fractional contrasts and minimum detectability for air, several concentrations of Renografin-60, and aluminum were studied using phantoms of various thicknesses. Results showed that the video-metric response, when treated as contrast, shows a linear response with absorber thickness up to considerable thicknesses. (Author)

A76-11703 Biomedical cost of low-level flight in a hot environment R R Bollinger (USAF, School of Aerospace Medicine, Brooks AFB, Tex) and G R Carwell (USAF, Regional Hospital, Shaw AFB, S C) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1221-1226 20 refs

The physiologic and performance effects of low level reconnaissance flying in hot environments were documented and quantitated. RF-4C pilots and weapons system operators were studied in hot and cool seasons during both high and low missions to distinguish environmental temperature from flight level effects. ECG, sternal and thigh skin temperatures, and cockpit temperature at helmet level were monitored continuously. Body weights, oral temperatures, sweat Na/K ratios, and urine electrolytes, steroids, and catecholamines, as well as sleep and fatigue scores, were measured. Mission performance was assessed using photo target acquisition scores. RF-4C aircrews are exposed to moderate heat stress and acute dehydration (12% over 90 min) during low level summer flights where cockpit temperature occasionally exceeded 50 C. Photo target scores indicated that the potential for crew error was increased and that the margin of safety was accordingly decreased during such hot missions. The RF-4C cockpit air conditioning system proved inadequate. (Author)

A76-11704 Body composition of mice following exposure to 4300 and 6100 meters J P Hannon and G B Rogers (US Army, Letterman Army Institute of Research, Presidio of San Francisco, Calif) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1232-1235 20 refs

Male Swiss mice were exposed for 3 and 7 d to simulated altitudes of 4300 and 6100 m. Body weight losses were enhanced at the higher elevation and after longer exposure at each elevation. Carcass analyses showed the weight losses to be attributable to decrements in body water and fat content. The water decrements were a little greater than the fat decrements after all exposure conditions. At both elevations, however, fat loss increased significantly as exposure was extended from 3 to 7 d whereas water loss remained unchanged. (Author)

A76-11705 Cardiomyopathy - The frequently forgotten mimic Clinical and open-chest myocardial biopsy studies G M FitzGibbon (National Defence Medical Centre Ottawa, Canada) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1248-1250 7 refs

Attention is drawn to the cardiomyopathies, 25 idiopathic cases being presented and the features noted which may mimic other conditions, especially coronary heart disease. Subtle clinical manifestations may be missed or misinterpreted unless these disorders are kept in mind. The diagnosis can usually be suspected at the bedside but specialized tests may be required to confirm it. Open chest myocardial biopsy has yielded exciting but not yet apparently useful results in six instances. Recognition of cardiomyopathy in aviation cardiology is important because of the high incidence of cardiac arrhythmia and sudden death associated with the condition. (Author)

A76-11706 Heart pathology associated with exposure to high sustained +Gz R R Burton and W F MacKenzie (USAF, School of Aerospace Medicine, Brooks AFB, Tex) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept. 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1251-1253 6 refs

Unanesthetized adult miniature and immature pigs were exposed to accelerations of +8 or 9 Gz for 45-90 seconds. Necropsies of adult pigs revealed gross evidence of hemorrhage in the endocardial area of

the left ventricles involving both the wall and the papillary muscles. The severity and extent of the subendocardial hemorrhage were quantified on a scale of 1 (slight) to 4 (extremely severe). Hemorrhaging in the papillary muscles of adult pigs following a single 45-90 second exposure to +9 Gz ranged from a mean of 2.3 to 3.3, and the extent of ventricular wall involvement was 2.5-3.3. Heart hemorrhage was limited to the subendocardial region, primarily the space between the heart muscle and the endocardium, and was particularly evident around Purkinje's fibers. Young farm pigs were much less susceptible to hemorrhage. It is suggested that particular attention be given to the endocardium of victims of high-performance aircraft accidents. C K D

A76-11707 Medical and psychiatric aspects of accident investigation R E Yanowitch (FAA, Office of Aviation Medicine, Washington, D C) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1254-1256

Mechanical failures are causative factors in 10-20% of fatal aircraft accidents, while biomedical factors account for 80-90% of such incidents. Accident investigation includes a complete autopsy and, where possible, toxicological studies of the blood, bile, urine, gastric contents, etc. to reveal the presence of substances causing pilot incapacitation such as alcohol, drugs, and carbon monoxide. The investigation of factors contributing to destructive stress reactions in aircraft crew members is described, and the role of stress response in aircraft accidents is discussed. C K D

A76-11709 Analysis of human factors in aircraft accidents P J Dean and R F Thatcher (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1260-1262

Basic approaches used in the analysis of human factors are discussed and a description is given of two recent examples of studies which led to a new evaluation of the employed methods of analysis. In the operational analysis, possible factors which might have played a role in the accident are identified with the aid of a guide list of about 100 items. G R

A76-11710 Cervicocranium and the aviator's protective helmet E J Colangelo (US Navy, Naval Safety Center, Norfolk, Va) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1263, 1264

It has been held that there is an analogy between the APH-6 aviator's helmet and the hangman's noose, with the inferior edge of the helmet, when visualized as part of a continuous circle completed by nape-strap and chin-strap, forming the noose, and with the lesions made about the neck by the straps or edge of the helmet paralleling the abrasions and the contusions that might be associated with a rope. It had been thought that a fractured, displaced odontoid process is the prototype lesion which endangers the victim with cervical cord, injury and death, but recent studies show mortality incidence of odontoid (or hangman's) fracture to be less than 10%. B J

A76-11711 Helmets and head protection in CF ejections 1967-1973 R E Noble (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1265, 1266

During the period 1967-1973, helmet retention and minor head injuries were significant problems in ejections from Canadian Forces (CF) aircraft. There were 73 ejections in which Canadian-designed helmets were worn. Eighty-four percent of those who lost their helmets and 38% of those who retained their helmets received minor

head injuries This paper reports on analysis of helmet loss versus air speed and G force Specific problems are addressed, including the fitting and method of wearing helmets, and some guidelines for enhancing helmet retention are recommended (Author)

A76-11712 Crew rest and nap-of-the-earth flying D S Berliner (U S Army, 101st Airborne Division (Airmobile), Fort Campbell, Ky) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1267-1270 8 refs

Nap-of-the-earth (NOE) flying was conceived to evade enemy detection of rotary wing aircraft, requiring the stressful technique of aircraft movement only inches above the ground terrain The NOE concept was tested from 12 June, 1973, to 30 June, 1974, for 3267 6 h in NOE training Four aircraft incidents occurred during this training period, with three of these taking place prior to 1 March, 1974 At that point, after 59 2% of the total hours had been flown, NOE pilot training was curtailed from 8 h/d to 4 h/d Objective and subjective data infer that pilot (crew) rest and the length of the flying day are important factors in the safety of NOE flying (Author)

A76-11713 Alcohol and other drugs in aircraft accidents A F Zeller (USAF, Air Force Inspection and Safety Center, Norton AFB, Calif) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1271-1274

During the 12-year period from 1962 through 1973, there were 89 USAF aircraft accidents or incidents in which alcohol and/or other drugs were mentioned as being in some way associated with the mishap A review of these indicates a relatively constant level of occurrence each year, with no indication that such accidents are increasing Alcohol was by far the most prominent drug mentioned A great variety of over-the-counter and prescription preparations were cited There were no instances in which illicit narcotics were involved Analysis indicates that the relationship was, in most instances, associative and not causative In some instances, the background disease for which the medication was being taken was far more probable as a cause agency The need for better documentation and greater cooperation between the flight surgeons and pathologists was indicated (Author)

A76-11714 Alcohol associated with fatal light aircraft accidents, United Kingdom - 1964-1973 K E Underwood Ground (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks, England) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1275-1279 19 refs

A76-11715 Error and artefact in post mortem toxicological analysis D G Wootton (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks, England) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1280-1283 14 refs

Factors influencing the quality of post mortem specimens obtained from victims of aircraft accidents and affecting the results of toxicological analyses are presented The effects of putrefaction processes on the results of such studies are considered, and lists of endogenous and artifact compounds found in connection with putrefaction are given Artifacts due to contamination of body tissues by bacteria and fuel products are discussed C K D

A76-11716 Impaired pilot performance - Drugs or alcohol K E Underwood Ground (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks, England) (*Joint Committee on Aviation*

Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1284-1288

The circumstances leading to forced landing of a three-seat light cabin monoplane due to engine failure are described The pilot, an airline pilot employed as a Boeing 707 captain, and one of the two passengers were killed The liver of the pilot showed diffuse fatty changes and toxicological examination revealed a blood alcohol concentration of 149 mg/100 ml and 139 mg/100 ml in the urine On initial screening for drugs, the presence of nitrazepam or chlorthalidone was suspected and the medical investigation was further complicated by the finding of chlorthalidone in the personal effects Although the cause of the accident was a stall at low altitude during an attempted forced landing following loss of engine power, it was concluded that the pilot's ability to avoid onset of stall was impaired by the concentration of alcohol in his system (Author)

A76-11717 What is the mechanism of carbon monoxide toxicity L R Goldbaum, R G Ramirez, and K B Absalon (U S Armed Forces Institute of Pathology, Washington Hospital Center, Washington, D C) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1289-1291 9 refs

The probable toxic action of CO is on the cellular respiration, in which CO competes with O₂ for cytochrome a₃ Studies indicate that a relatively high concentration of COHb (50%) does not interfere with the O₂-carrying capacity of the blood The dissolved CO in plasma, which is necessary for CO to enter the tissue, probably occurs when the exchange takes place between alveolar air and the blood in the lungs This would explain why the central nervous system could be impaired when COHb levels are below 10% and death could occur at 35% (Author)

A76-11718 Analysis of gases and pH of blood at altitude J H Wolcott and R R McMeekin (U S Armed Forces Institute of Pathology, Washington, D C) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1292-1296

The accuracy of a system for measuring pH and gas in blood in a changing-altitude environment was studied No problems were encountered when arterial blood was measured, provided the instrument was properly calibrated Failure to calibrate to the correct altitude settings caused major variations in measuring oxygen levels in blood Standard gases used for calibrating were measured at altitude without recalibrating the system, approximately 80% of the oxygen and 90% of the carbon dioxide partial-pressure values were within 3 mm Hg of their expected value More deviation occurred for PO₂ values as the altitude increased Frequently, the PO₂ electrode malfunctioned, particularly above 8000 ft (2438 m) The Corning blood gas system used in this study was capable of making accurate determinations of gas in blood if properly operated and calibrated to specific altitude levels (Author)

A76-11719 Application of radioimmunoassay techniques in support of toxicologic investigations of aircraft accidents W W Manders and A M Dominguez (U S Armed Forces Institute of Pathology, Washington, D C) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1297, 1298

A76-11720 Coronary artery disease and preventive cardiology in aviation medicine F S Pettyjohn (U S Army, Aeromedical Research Laboratory, Fort Rucker, Ala) and R R McMeekin (U S Armed Forces Institute of Pathology, Washington, D C) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept. 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1299 1304 18 refs

A review of 6500 autopsied cases of deaths resulting from aircraft mishaps revealed 816 deaths (13%) attributed to pre-existing heart disease. The presence of atherosclerotic coronary artery disease (CAD) was noted in 89.1% of these cases. The incidence of CAD was studied as a function of the year in which death occurred and age of death, both in 5-year ranges, to determine the frequency of CAD in the aviation community. Results are compared with those of other autopsy studies. A progressive rise in the incidence of combined moderate and severe CAD is noted in the 20-34 age group. Recommendations are given for programs of preventative and predictive cardiology in the aviation community. C K D

A76-11844 Experimental models for the evaluation of microwave biological effects P Czerski (National Research Institute of Mother and Child, Warsaw, Poland) *IEEE, Proceedings*, vol 63, Nov 1975, p 1540-1544 55 refs

The theoretical and empirical approaches to biological effects of microwaves are discussed. The bioeffects should be considered as a chain of events: primary interaction analyzed in terms of biophysics and early direct, early indirect, late (delayed) effects analyzed in terms of physiology. Thermal balance experiments are discussed pointing out the necessity to take unequal deep body heating by microwaves into account. The use of physiologic rhythms in microwave bioeffects experimentation is presented. Possible use of pharmacodynamic approaches (simultaneous use of drugs and microwave exposure) is outlined. Possible ways of developing biological response microwave dosimetry are indicated. Unexplained effects are pointed out and the necessity of further experiments to clarify these is stressed. Some possible experimental models are presented.

(Author)

A76-11874 # Pathological-anatomical studies involving vascular stenoses (Pathologisch-anatomische Untersuchungen an Gefassstenosen). H Buss, H Richter, and J Schoenmackers (Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany) *Rheinisch-Westfälische Technische Hochschule, Aerodynamisches Institut, Abhandlungen*, no 22, 1975, p 166-171 11 refs. In German. Research supported by the Deutsche Forschungsgemeinschaft.

It is shown with the aid of an example involving arterial vascular stenosis that different methodological approaches can be used to obtain results which describe the same phenomenon as a disturbance of, for example, the flow of the blood, the function of the heart, or the vascular wall structure. Attention is given to the preparation of models for the conduction of flow experiments, the techniques used to observe the flow characteristics, and studies with a scanning electron microscope. The results obtained in the various investigations are discussed. G R

A76-11917 # Some particulars on the training of aviation physicians (Nekotorye osobennosti podgotovki aviatsionnykh vrachei) N M Rudnyi, I I Vavilov, and V I Kopanov *Voenno-Meditsinskii Zhurnal*, Aug 1975, p 18-21. In Russian.

The training of specialists in aviation medicine must emphasize skill in diagnosis and in basic clinical practice while developing expertise in the evaluation of psychological and physical stresses placed on pilots and aircraft crew. It is particularly essential that these physicians receive training in the early detection of disease. To assess the experience and qualifications of individual physicians it is suggested that specialists in this field receive classifications, subject to revision on the basis of periodic reviews. C K D

A76-11918 # Ways of further perfecting methods of vestibular selection (Puti dal'neishego sovershenstvovaniia metodov vestibuliarnogo otbora) E M Iuganov, E V Lapaev, V V Ivanov, and O A Vorob'ev *Voenno-Meditsinskii Zhurnal*, Aug 1975, p 55-57. In Russian.

The cumulative effects of Coriolis and centripetal accelerations upon the vestibular apparatus was studied in a group of healthy men from 20 to 45. It was found that tolerance of Coriolis acceleration was strongly dependent upon the angle of inclination of the head and torso: relatively high (0.1 g) Coriolis accelerations produced less disturbance with the head in a vertical position than relatively low (0.025 g) accelerations experienced with the head sharply inclined. The rapidity with which centripetal accelerations produced symptoms of vestibular disturbance was proportional both to their magnitude and to their duration. C K D

A76-11919 # Aviation audiometric lists (Aviatsionnye audiometricheskie tablitsy) V S Kuznetsov, V A Kurashvili, M I Katalov, and A S Zharkala *Voenno-Meditsinskii Zhurnal*, Aug 1975, p 57-60. In Russian.

The composition of aircraft radio telephony communications was analyzed to determine the frequency of individual words and the percentage of words of a given length. Audiometric lists were formulated on the basis of these data and on the basis of similar data reflecting patterns in nonspecialized speech. A group of aviation specialists, 1/3 of whom had some reduction of tonal hearing, and a control group with no specialized training were tested at various noise levels with both types of lists. Results demonstrate that audiometric lists using the aviation lexicon are more useful in evaluating the hearing of pilots. The specialized vocabulary could be distinguished at relatively high noise levels by the pilots having some loss of tonal hearing. C K D

A76-11920 # Hemodynamic indicators in air personnel of varying ages (Pokazatel'i gemodinamiki u letnogo sostava razlichnykh vozrastov). V V Lemesh *Voenno-Meditsinskii Zhurnal*, Aug 1975, p 70, 71. In Russian.

The age characteristics of hemodynamic indicators were investigated in four groups of aircraft personnel: groups 1 and 2 (mean ages 29.1 and 39.3 years) made up of healthy men, groups 3 and 4 (mean ages 30.6 and 39.3) composed of men suffering from hypertonic neurocirculatory dystonia. Spirograms, combined electrocardiograms, and arterial pressure were recorded over a 5 minute period during which subjects breathed either pure oxygen or 9.5% oxygen, 90.5% nitrogen. For the healthy men, the changes in the hemodynamic indicators due to hypoxia were smaller in the older men, while in the other groups the reaction to hypoxia was not age dependent. In healthy men breathing pure oxygen, all indicators studied increased with increasing age, with the exception of peripheral resistance which showed age-dependent decrease. C K D

A76-11921 # Apparatus for the combined study of the functions of the auditory and visual analyzers (Pribor dlia kompleksnogo obsledovaniia funktsii slukhovogo i zritel'nogo analizatorov) M S Gonchar and T S Voronin *Voenno-Meditsinskii Zhurnal*, Aug 1975, p 75-77. In Russian.

A portable apparatus for the investigation of the visual and auditory analyzers has been developed. It permits the study of a wide range of factors including the critical frequency of the achromatic and chromatic flicker fusion, the period of a simple motor reaction, selective responses to achromatic and chromatic light stimuli, perception of sound signals of various frequencies and intensities, and the functional lability of the visual analyzer. The schematic circuit of the apparatus is presented, and its use is discussed. C K D

A76-12097 Effect of elastic loading on ventilatory response to hypoxia in conscious man. A S Rebuck, M Betts, and N A Saunders (McMaster University, Hamilton, Ontario, Canada). *Journal of Applied Physiology*, vol 39, Oct 1975, p 548-551 19 refs Medical Research Council of Canada Grant No MA-5126

Ventilatory responses to isocapnic hypoxia, with and without an inspiratory elastic load, were measured in seven healthy subjects using a rebreathing technique. During each experiment, the end-tidal CO₂ partial pressure was held constant using a variable-speed pump to draw gas from the rebreathing bag through a CO₂ absorbing bypass. Elastic loading did not significantly alter the ventilatory response to progressive hypoxia. In all subjects there was, however, a change in breathing pattern during loading, whereby increments in ventilation were attained by smaller tidal volumes and higher frequencies than in the control experiments. These results support the hypothesis that a similar control pathway appears to be involved in response to the application of loads to breathing, whether ventilation is stimulated by hypoxia or hypercapnia. (Author)

A76-12098 Effect of altitude exposure on platelets. G W Gray, A C Bryan, M H Freedman, C S Houston, W F Lewis, D M McFadden, and G Newell (Defence and Civil Institute of Environmental Medicine, Hospital for Sick Children, Toronto, Arctic Institute of North America, Mt Logan, Yukon Territory, Canada). *Journal of Applied Physiology*, vol 39, Oct 1975, p 648-651 18 refs

Since decomposition from depth is known to produce a fall in platelet count, the effect of altitude decompression and high-altitude exposure on platelets was investigated. Sixteen subjects decompressed without hypoxia to 20,000 ft simulated altitude for two hours showed a significant drop in circulating platelet count of approximately 10% for three days following decompression. Subjects exposed to 9,800 ft and then 17,600 ft in a mountain environment showed a significant mean decrease in platelet count on day 2 of 7% and 25% respectively, which had returned to control by day 5. It is postulated that altitude decompression produces platelet reductions similar to these seen after decompression from depth, and that platelets sequester in the pulmonary vascular bed. (Author)

A76-12099 Changes in the single-breath nitrogen washout curve on exposure to 17,600 ft. G W Gray, D M McFadden, C S Houston, and A C Bryan (Defence and Civil Institute of Environmental Medicine, Toronto, Arctic Institute of North America, Klauane Lake, Yukon Territory, Canada). *Journal of Applied Physiology*, vol 39, Oct 1975, p 652-656 22 refs

Seventeen volunteers were exposed to 17,600 ft after an acclimatization period at 9,800 ft. Single breath nitrogen washout curves were done at base camp (2,600 ft), on days 2 and 4 at 9,800 ft, and on days 1, 2, 3, 4 and 7 at 17,600 ft. There was a significant 39% increase in the slope of phase III on day 2 at 9,800 ft, accompanied by a 125 ml mean increase in anatomic dead space (VD) and a marked decrease in cardiac oscillations. By day 4 at 9,800 ft phase III slopes were reduced and were not significantly different from base-line controls, while cardiac oscillations were increased and VD decreased from day 2. Subsequent exposure to 17,600 ft produced another significant increase in phase III slope to 87% above control, which by day 7 had decreased significantly to 63% above control. These changes suggest a pathophysiologic lung lesion which impairs gas mixing and increases asynchronous emptying during early altitude exposure. (Author)

A76-12162 Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart. H Brooks, J Al-Sadir, J Schwartz, B Rich, P Harper, and L Resnekov (Chicago, University, Franklin McLean Memorial Research Institute, Chicago, Ill.). *American Journal of Cardiology*, vol 36, Nov 1975, p 765-775 32 refs. Research supported by the Louis Block Fund and University of Chicago, Grants No NIH-HL-70-132-02, No NIH-N01-81334, No PHS-BM-18940

A76-12163 Measurement of regional myocardial blood flow in man - Description and critique of the method using xenon-133 and a scintillation camera. P J Cannon, R R Sciacca, D L Fowler, M B Weiss, D H Schmidt, and W J Casarella (College of Physicians and Surgeons, New York, N.Y.). *American Journal of Cardiology*, vol 36, Nov 1975, p 783-792 44 refs. Grants No PHS-HL-14148, No PHS-HL-14236

A76-12164 The application of conductive cooling to human operators. E Shvartz (Chamber of Mines of South Africa, Human Sciences Laboratory, Johannesburg, Republic of South Africa). *Human Factors*, vol 17, Oct 1975, p 438-445 18 refs

The application of conductive cooling for men working in different systems is discussed with respect to work load, heat stress, and clothing. Two types of conductive cooling are considered: circulating water, and ice. A brief review of the effects of whole and partial body cooling on the responses of man to heat stress serves as a basis for suggestions about desirable types of cooling which would allow the human operator to maintain satisfactory performance for extended periods. (Author)

A76-12165 Training transfer of a formation flight trainer. G B Reid (USAF, Human Resources Laboratory, Williams AFB, Ariz.). *Human Factors*, vol 17, Oct 1975, p 470-476 11 refs

The present research was conducted to measure transfer of training from a formation simulator to aircraft formation flying. Evidence in support of positive transfer was obtained by comparing students trained in the formation simulator with students who were essentially untrained and with students trained in the aircraft. This design provided data for a direct comparison of five simulator sorties with two aircraft sorties, in an effort to establish quickly a training cost/transfer comparison. The results indicate that simulator training has at least the effectiveness of two aircraft sorties. (Author)

A76-12211 # Changes in the oxygen tension and bio-electrical activity of the animal brain in acute hypoxia (Izmeneniia napriazheniia kisloroda i bioelektricheskoi aktivnosti golovnogo mozga zhivotnykh pri vozdeistvii ostrogo gipoksii). N S Akopian and O G Baklavadzian (Erevanskii Gosudarstvennyi Universitet, Yerevan, Armenian SSR). *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1303-1309 24 refs. In Russian

Simultaneous recording of oxygen tension (PO₂) and bio-electrical potentials for different cerebral structures in rabbits and rats was carried out through implanted electrodes under conditions of acute oxygen deficiency. A pronounced activation of EEG considered as an electrophysiological correlate of behavioral response was observed in rabbits only at the beginning of ascent to high altitude and descent from it, whereas rats did not show any response of this kind. EEG, respiration, and cardiac activity changes due to a drop in the PO₂ of the brain tissue were almost of the same character in both species. S D

A76-12212 # Microelectrode study of the distribution of oxygen tension in the brain (Issledovanie mezhkapillarnogo raspredeleniia PO₂ v golovnom mozge s pomosh'iu mikroelektrodov). I T Demchenko (Akademiia Nauk SSSR, Institut Evolutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) and A E Chuikin (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1310-1317 19 refs. In Russian

The behavior of oxygen tension (PO₂) distribution in the intercapillary spaces in the cortex of nonanesthetized and immobilized cats under normal and hypoxic conditions is investigated through specially designed microelectrodes 1-3 microns in diameter. A simple technique is proposed for estimating the resulting intercapillary PO₂. Under normal conditions, absolute values of PO₂ are found to vary between 1 and 95 mm Hg. Initially high PO₂ undergoes maximum changes in hypoxia, whereas lower PO₂ values show no significant change. Analysis of the parameters of PO₂ distribution is helpful in developing a method for estimating the effectiveness of oxygen supply to the brain tissue. S D

A76-12213 # On the role of the hypothalamus in the mechanism of positional nystagmus (O roli gipotalamusa v mekhanizme pozitsionnogo nistagma) V E Koriukin (Voenno-Meditsinskaya Akademiya, Akademiya Meditsinskikh Nauk, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1337-1342 19 refs In Russian

A76-12214 # Rotatory and vertical components of the eye nystagmus induced by rotation in a horizontal plane (O rotatornoi i vertikal'noi sostavliaushchikh v glaznom nistagme, vyzvanom vrashcheniem v gorizontальной ploskosti) M M Levashov and Iu K Stolbkov (Akademiya Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1343-1350 11 refs In Russian

The eye movements of a rabbit rotating about a vertical axis were recorded on film. The rotation test involved positive angular acceleration, two-minute rotation at a constant angular speed, and negative angular acceleration. Two types of rotation were used: rotation axis between the labyrinths and an off-centered rotation providing a centrifugal force of 0.5 g. Successive film processing revealed the simultaneous movements of the eye in three planes: horizontal, frontal, and sagittal. The movements in all the planes consisted of rhythmic nystagmic and tonic components. In addition, a tonic otolith reflex occurred during the off-centered rotation. The complex form of the resulting vestibular nystagmus is attributed to hydromechanical interaction between the semicircular canals. S D

A76-12215 # The processing of a colored signal by various types of ganglionic cells in the frog retina (Obrabotka tsvetovogo signala razlichnymi tipami ganglioznykh kletok setchatki liagushki). B A Funtikov and I K Boreisha (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1351-1358 34 refs In Russian

The response to colored stimuli was studied using sections of frog retina containing two types of rod cells (with maximum absorptions in the region of 502 and 433 nm) and two types of cone cells: single, with maximum absorption at 575 nm, and duplex, with the main and complementary parts absorbing at in the region of 575 and 502 nm, respectively. It was found that only a few neurons functioned according to the opponent principle when the stimulus color was changed. A large number of the slow-firing on-off neurons altered their discharge pattern, and a sizeable group of on-neurons was sensitive to the order of the colored stimuli, displaying delays in their response that were dependent on the color of the initial stimulus. On the basis of these results it is suggested that temporal rather than spatial comparison is the mechanism of color identification. C K D

A76-12216 # The condition of the vascular net and the hemoecephalic barrier in the brain cortex of rats in the course of training for hypoxia (Sostoianie sosudistoi seti i gematoentsefalicheskogo bar'era v kore golovnogo mozga kryv v protsesse trenirovki k gipoksii) L N Simanovskii, A A Nikiforov, and V M Bresler (Akademiya Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1373-1380 33 refs In Russian

A76-12217 # Interaction between pressor and depressor mechanisms in the self-regulation of arterial pressure (O vzaimodeistvii pressornykh i depressornykh mekhanizmov v samoregulatsii arterial'nogo davleniia) K V Sudakov and M M Rasulov (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1387-1396 20 refs In Russian

The paper discusses the interaction of pressor and depressor effects in a functional system maintaining a constant level of blood pressure in the body. It is shown that under normal conditions the threshold depressor effects of the aortic nerve are stronger than its threshold pressor effects during stimulation of both the hypothalamic pressor points and the pressor zones of the bulbar

vasomotor center. Monomodal and polymodal neurons as related to the excitation of pressor zones in the posterior hypothalamus and of the aortic depressor nerve are revealed in some structures of the cardiovascular center in the medulla oblongata. It is suggested that convergent neurons are responsible for the end result of antagonistic pressor and depressor interactions at the level of the medulla oblongata neurons. S D

A76-12244 Variations in psychomotor efficiency during prolonged stay at high altitude V M Sharma, M S Malhotra, and A S Baskaran (Defence Institute of Physiology and Allied Sciences, Delhi, India) *Ergonomics*, vol 18, Sept 1975, p 511-516 15 refs

Alterations in psychomotor efficiency of 25 young adults (age range 21-30 yr) were studied during their stay up to two yr at an altitude of 4000 m. Psychomotor performance, its speed and accuracy were measured by administering an eye-hand coordination test at sea level and altitude after stay periods of 1, 10, 13, 18 and 24 months. Overall psychomotor efficiency, its accuracy and speed declined during early stages of altitude exposure. A progressive recovery was registered in overall performance by way of improvement in accuracy after 13 months presumably due to acclimatization. Speed in performance showed no such gradual return to sea-level standard. (Author)

A76-12301 # Changes in peripheral vessels tone during acute hypoxia (Pro zmini tonusu periferichnikh sudin pri gostrui gipoksichnii gipoksii) V V Bratus' and N N Volkova (Akademiya Nauk Ukrain's'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal*, vol 21, Sept-Oct 1975, p 602-606 22 refs In Ukrainian

The changes in the systemic hemodynamics as well as in the arterial and venous tone were studied at the initial stages of acute hypoxia. All the investigated effector elements of the cardiovascular system are shown to take an active part in development of the pressor reaction on respiration by the hypoxic mixture. But an increase in the heart activity and the rise of the venous tone occur much earlier than the distinct arterial constriction. (Author)

A76-12302 # Change in brain blood circulation during mental activity (Zmini mozgovogo krovoobigu pri rozumovii dial'nosti) S M Rashman (Kievskii Pedagogicheskii Institut, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal*, vol 21, Sept-Oct 1975, p 607-611 10 refs In Ukrainian

The brain circulation was studied by the method of rheoencephalography during mental activity of different character. When mental activity is long and without developed emotions a tendency is observed to an increase in the brain blood supply after the work to slowing down in the rate of blood flow through the brain vessels with definite changes in the rheoencephalographical curve shape. With a short period but nervous-emotional mental activity the changes in blood supply or blood flow rate are not developed, however the curve shape may vary considerably, being the plateau shaped, dome-shaped or pointed for a short period of time with appearance of the additional diastolic teeth and with sharp unsynonymous fluctuations in some rheoencephalographic indices. (Author)

A76-12303 # Change in absorption and secretion functions of small intestine under the influence of rocking (Zmina vsmokturnal'noi i sekretornoi dial'nosti kishechnika pid vplivom priamolininikh priskoren') R O Fattel'berg, Iu F Udalov, L I S'omik, and G V Gladkii (Odesskii Gosudarstvennyi Universitet, Odessa, Ukrainian SSR) *Fiziologicheskii Zhurnal*, vol 21, Sept-Oct 1975, p 659-666 14 refs In Ukrainian

The absorption and secretion functions of the small intestine under rocking were studied in 7 dogs with the jejunum isolated by the Thiry method. It was found that under the influence of rocking absorption of glucose and glycine is decreased but that of copper and manganese trace elements is increased. Preparation 'Pitaf' removes

the depressing influence of rocking on absorption of glucose and glycine. Simultaneously with a change in absorption a change in secretion of the intestinal juice was observed in response to the introduced substances. The proteolytic and aminolytic activities of the intestine juice under the effect of rocking increased. (Author)

A76-12304 # Change in the functional state of the central nervous system and the motor apparatus of athletes under different conditions of activity and rest (Zminy funktsional'nogo stanu tsentral'noi nervovoi sistemi i rukhovogo aparata sportsmeniv v umovakh riznykh rezhimiv dial'nosti i vidpochinku) P L Levakovskii, O Ia Pirogova, and G M Chaichenko (Kiiivs'kii Derzhavnyi Universitet, Kiiivs'kii Institut Medichnikh Problem Fizichnoi Kul'turi, Kiev, Ukrainian SSR) *Fiziologichnyi Zhurnal*, vol 21, Sept-Oct 1975, p 675-681 15 refs. In Ukrainian

A76-12305 # Multichannel rheograph with linear conversion characteristic and demodulation of pulsed blood filling at minimum probe current (Bagatokanal'nyi reograf z liniinomu kharakteristikou peretvorennia i demodulatsii pul'sovogo krovonapovnennia pri minimal'nomu strumi zonduvannia) A A Novikov and F F Getman (Odes'kii Medichnyi Institut, Odessa, Ukrainian SSR) *Fiziologichnyi Zhurnal*, vol 21, Sept-Oct 1975, p 698-700 10 refs. In Ukrainian

A76-12337 Backward recognition masking. D W Massaro (Wisconsin, University, Madison, Wis.) *Acoustical Society of America, Journal*, vol 58, Nov 1975, p 1059-1065 10 refs. Grant No PHS-MH-19399

Backward recognition masking refers to the interference of a second sound on recognition of another sound presented earlier in time. Previous experiments have demonstrated backward recognition masking in an absolute judgment task. In those experiments, all of the experimental conditions were varied randomly within a test session. In the first experiment reported here, backward-masking functions generated between blocks of trials were compared to those determined within an experimental session. The results showed backward masking using both experimental procedures. The next two experiments evaluate backward-masking effects in a two-interval forced-choice task and a successive-comparison task. Backward masking was observed in both experiments. The final experiment showed that selectively attending to the ear of the test tone presentation does not attenuate the backward-masking effect of a second tone presented to the opposite ear. (Author)

A76-12430 * Ernst Mach on the vestibular organ 100 years ago. V Henn (Zurich, Universitat, Zurich, Switzerland, MIT, Cambridge, Mass.) and L R Young *ORL*, vol 37, 1975, p 138-148 27 refs. Grant No NGR-22-009-701

The paper reviews the contributions of Ernst Mach to vestibular research. His experiments, mainly psychophysical in nature, included measurements of threshold and investigation of the vestibular-visual interaction. Among his conclusions are that the adequate stimulus for the semicircular canals must be pressure, and that the sustained endolymph flow theory of Breuer (1874) and Crum Brown (1874) is erroneous. Excerpts are given of Mach's publications on vestibular functions. B J

A76-12445 * Effects of shifts in the rate of repetitive stimulation on sustained attention. J E Krulowitz (Iowa State University of Science and Technology, Ames, Iowa), J S Warm, and T H Wohl (Cincinnati, University, Cincinnati, Ohio) *Perception and Psychophysics*, vol 18, no 4, Oct 1975, p 245-249 18 refs. Research sponsored by the U.S. Department of Health, Education, and Welfare, Grant No. N 3L-36-004-014

The effects of shifts in the rate of presentation of repetitive

neutral events (background event rate) were studied in a visual vigilance task. Four groups of subjects experienced either a high (21 events/min) or a low (6 events/min) event rate for 20 min and then experienced either the same or the alternate event rate for an additional 40 min. The temporal occurrence of critical target signals was identical for all groups, irrespective of event rate. The density of critical signals was 12 signals/20 min. By the end of the session, shifts in event rate were associated with changes in performance which resembled contrast effects found in other experimental situations in which shift paradigms were used. Relative to constant event rate control conditions, a shift from a low to a high event rate depressed the probability of signal detections, while a shift in the opposite direction enhanced the probability of signal detections. (Author)

A76-12446 Influence of foveal load on the functional visual field. M Ikeda and T Takeuchi (Tokyo Institute of Technology, Tokyo, Japan) *Perception and Psychophysics*, vol 18, no 4, Oct 1975, p 255-260 26 refs

The functional visual field defined in terms of a discrimination task of a target presented peripherally among ambiguous background patterns was investigated for various foveal loads which were to be recognized at the central retina. Foveal loads were numbers, letters, place names, traffic signs, and other figures to simulate commonplace situations for foveal information processing, and grouped into three in order of recognition difficulty based on daily experience. Boundaries of the functional visual field were obtained for simple fixation and for certain foveal loads. Comparison of these boundaries clearly showed shrinkage of the functional visual field size with the foveal loads of greater recognition difficulty. (Author)

A76-12447 * Intermodal transfer in temporal discrimination. J S Warm, R M Stutz, and P A Vassolo (Cincinnati, University, Cincinnati, Ohio) *Perception and Psychophysics*, vol 18, no 4, Oct 1975, p 281-286 28 refs. Grants No DA-49-193-2918, No NGL-36-004-014

This study determined if training for accuracy in temporal discrimination would transfer across sensory modalities. A fractionation method was used in which subjects bisected the durations of acoustic and visual signals at three standard intervals (6, 12, and 18 sec). Absolute error was the performance index. Half of the subjects were trained with acoustic stimuli and then tested in vision, the remainder were trained in vision and tested in audition. Similar negatively accelerated acquisition functions were noted for both modalities. Positive intermodal transfer, characterized by symmetry across modalities, was obtained at all standard durations. The results were considered to provide support for the notion that a common mechanism underlies temporal discriminations in different sensory systems. (Author)

A76-12475 Biochemical aspects of acclimatization of man to high altitude stress. K K Srivastava (Defence Institute of Physiology and Allied Sciences, Delhi, India) *Defence Science Journal*, vol 25, July 1975, p 121-126 64 refs

The paper reviews the biochemical aspects of acclimatization of human body to high altitude with particular reference to the adaptive changes in skeletal muscles, hepatic function, adrenal function and carbohydrate metabolism. (Author)

A76-12481 # Human aspects of observation outside the space cabin (Chelovecheskie aspekty vnekabinnogo nabludeniia) A G Nikolaev. In Ergonomic dynamic control systems. Kiev, Izdatel'stvo Naukova Dumka, 1975, p 94-109 15 refs. In Russian

The paper examines the dynamics of the visual operative capacity of astronauts in flight. An algorithmic schematic representation of visual observation is presented, describing an astronaut's activity as he observes and describes an atmospheric phenomenon.

Data are presented showing the variation of visual capacity over a long-duration flight. Some tests and materials used for monitoring vision in flight are described. P T H.

A76-12525 Effects of hypoxia on peripheral visual response to dim stimuli. J L Kohnick (U S Army, Research Institute of Environmental Medicine, Natick, Mass.) *Perceptual and Motor Skills*, vol 41, Oct 1975, p 467-474 12 refs

Response times (RTs) of 9 Ss were obtained for detection of 48 flash stimuli distributed throughout the visual field during 3-1/4-hr exposures to each of 4 hypoxia conditions (0, 13,000, 15,000, 17,000 feet equivalent elevation). The luminances of all stimuli were set in common at the detection threshold value for the visual periphery. RTs were impaired in direct relation to hypoxic exposure severity, the peak impairments occurring within 90 min followed by gradual recovery. Since the present results showed less impairment than previous data for brighter stimuli using the same task, it is concluded that stimulus contrast is more critical to peripheral signal detection than absolute stimulus luminance, particularly under hypoxic exposure. (Author)

A76-12551 All-Union Conference on Engineering and Medical Biomechanics, 1st, Riga, Latvian SSR, October 1975, Reports (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, October 1975, Doklady) *Mekhanika Polimerov*, July-Aug 1975 192 p. In Russian

The papers collected represent theoretical and experimental studies of the mechanical properties of biological tissues and structures. Some of the topics covered include a model of vascular tonus, study of the dynamical behavior of skeletal muscle as a viscoelastic body, the elastic and damping properties of the human. Cooling decreased the toxicity of cyclizine and had no significant effect on that of trimethobenzamide or aspirin. These findings indicate that alterations in environmental temperature markedly affect drug toxicity. They emphasize that such alterations, and particularly increases in temperature, do not have to be particularly drastic, but that 'mild' variations in the environment are effective in altering an animal's sensitivity to a drug. (Author)

A76-12552 # Mathematical description of the properties of muscle tissue (Matematicheskoe opisaniie svoistv myshechnoi tkani) S A Regirer, P I Usik, and I V Chernova (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975) *Mekhanika Polimerov*, July-Aug 1975, p 579-584 37 refs. In Russian

A brief survey of theoretical investigations devoted to the mathematical description of the properties of muscle tissue is given. Basic approaches to the problem are described, and their merits and disadvantages are discussed. The need for a continuum model of muscle is expressed, corresponding to modern concepts regarding continuous media. A procedure for constructing such a model is outlined, and fundamental and auxiliary hypotheses and conclusions following from a comparison of the theory with experimental data are studied. P T H.

A76-12553 # Model of vascular tonus (Model' sosudistogo tonusa) S A Regirer, I M Rutkevich, and P I Usik (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975) *Mekhanika Polimerov*, July-Aug 1975, p 585-589 13 refs. In Russian

The paper investigates the use of general concepts of the mechanics of muscle tissue in constructing a simplified model describing the mechanical behavior of a blood vessel wall containing muscular layers. The concept of tonus is mathematically formalized, and a control parameter is introduced that has the sense of the concentration of the activator of mechanical-physical reactions in the myofibrils. The properties of vessels whose static characteristic has a

section with negative slope are investigated, with special attention given to the case when this segment is due to the strong dependence of tonus on the stress state of the vessel wall. P T H.

A76-12554 # Governing law of statistical biomechanics (Zakonomernost' statisticheskoi biomekhaniki) F K Agashin (Moskovskii Aviatsonnyi Institut, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975) *Mekhanika Polimerov*, July-Aug 1975, p 590-596 6 refs. In Russian

A principle of statistical biomechanics is formulated in the form of an inverted distribution of the population of levels of a biological system, such as the system of sarcomeres. It is shown that in such a system a new type of condensation appears, which takes place at a maximally high energy level for the given system. The activity of the sarcomere system, appearing in the form of induced radiation of elastic waves, provides an additional mechanism for the transmission of information in man and a related mechanism of programmed automatic control of fast processes. P T H.

A76-12555 # The deformation properties of contractile polymer structures - Artificial muscles (O deformativnykh svoistvakh sokratitel'nykh polimernykh struktur - Iskusstvennykh myshts) R V Beliaikov (Kievskii Institut Inzhenierov Grazhdanskoi Aviatcii, Kiev, Ukrainian SSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975) *Mekhanika Polimerov*, July-Aug 1975, p 597-602 14 refs. In Russian

A dynamic theory is presented for the longitudinal deformation of contractile polymer structures (artificial muscles). A linear approximation for small deformations is developed. Attention is given to elastic-osmotic structures consisting of disperse systems of more or less diluted gels in which the deformation depends on the degree of swelling. Viscoelastic properties of the gel matrix are represented by the classical Kelvin-Voigt model. Material exchange between the surrounding medium and the polymer body is considered in the form of a flow of penetrating particles through the membrane surface of an equivalent elastic-osmotic cell. P T H.

A76-12556 # Effect of a sequence of activating pulses on the contractile properties of muscle (Vlianie posledovatel'nosti aktiviruiushchikh impulsov na sokratitel'nye svoistva myshtsy) Iu S Levik (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975) *Mekhanika Polimerov*, July-Aug 1975, p 613-617 12 refs. In Russian

The effect of a doublet stimulus pulse on isometric muscular contraction in man was investigated. Experiments were conducted on the flexor digitorum sublimis, the abductor muscle of the index finger, and the frontal tibial muscle. Changes in the active state were measured by recording muscle contraction force and its derivative. It is shown that a persistent increase in the contraction force after the doublet pulse is related to the intensification of the active state and the inhibition of its decay. Significant changes in the rate of force development were also observed, due to transmission. P T H.

A76-12557 # Theoretical study of some features of the dynamics of the behavior of skeletal muscle as a one-dimensional viscoelastic medium (Teoreticheskoe izucheniie nekotorykh osobennostei dinamiki povedeniia skeletnoi myshtsy kak odnomernoi viazkoupругoi sredy) E I Pal'tsev (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975) *Mekhanika Polimerov*, July-Aug 1975, p 618-625 15 refs. In Russian

A76-12558 # Determination of the elastic and damping properties of the human femoral bone during bending (Opredelenie uprugikh i dempfiruiushchikh svoystv bedrennoi kosti cheloveka pri izgibe) V N Butriakov, G Ia Panovko, and B A Potemkin (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 642-646 13 refs In Russian

A76-12559 # The anisotropy of compact bone material subject to impact loads (Anizotropiia kompaktnogo veshchestva kosti pri udarnykh nagruzkakh) A A Uten'kin (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 655-658 7 refs In Russian

A76-12560 # Study of the propagation of vibrations along the human hip bone (Issledovanie rasprostraneniia vibratsii po bedrennoi kosti cheloveka) V N Butriakov, G Ia Panovko, B A Potemkin, G A Safarashvili, and K V Frolov (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 680-684 7 refs In Russian

A76-12561 # Low-frequency acoustic characteristics of biological tissues (Nizkochastotnye akusticheskie kharakteristiki biologicheskikh tkanei) A P Sarvazian (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Moscow, USSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 691-695 6 refs In Russian

The propagation of elastic waves of various types in biological tissues is studied experimentally and theoretically for the acoustic range of frequencies. The contribution to the velocity of the elastic waves made by the real and imaginary components of the complex elastic modulus is analyzed. It is shown that in soft tissues, low-frequency elastic disturbances propagate mainly with the aid of shear waves. Geometric dispersion of velocity of elastic waves was studied experimentally on models of gel-like systems, and results for a system with Poisson coefficient of about 0.5 were in good agreement with calculated results based on the dispersion equation.

P T H

A76-12562 # Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls (Vliianie psikhoemotsional'nogo napriazheniia i fizicheskoi aktivnosti cheloveka na vozrastnye izmeneniia mekhanicheskikh svoystv stenok arterii) A D Valtneris (Rizhskii Meditsinskii Institut, Riga, Latvian SSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 701-703 10 refs In Russian

A76-12563 # Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject (Razlichiiia deformativnykh i prochnostnykh svoystv krupnykh krovenosnykh sosudov v zavisimosti ot ikh lokalizatsii, napravleniia nagruzheniia i vozrasta cheloveka) V A Kas'ianov and A F Kregers (Akademiia Nauk Latvviskoi SSR, Institut Mekhaniki Polimerov, Riga, Latvian SSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 704-710 13 refs In Russian

A76-12564 # Morphological and functional aspects of studying some mechanical properties of the human aorta (Morfologicheskie i funktsional'nye aspekty izucheniiia nekotorykh mekhanicheskikh svoystv aorty cheloveka) Iu A Iartsev (Saratovskii Gosudarstvennyi Meditsinskii Institut, Saratov, USSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 730-736 25 refs In Russian

A76-12565 # Electrical modeling of the blood circulation system (Ob elektricheskom modelirovanii sistemy krovoobrashcheniia) A K Tsaturian (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct. 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 761-765 5 refs In Russian

An electrical model of the arterial part of the human vascular system is presented. Impedance, the shape of pressure and discharge waves, and static operating characteristics of the vascular system under normal and artificial circulation conditions are studied on the model. Regarding artificial circulation pumping, the problem of quasi-one-dimensional flow of a viscous fluid in a tube with wave-like varying radius is considered.

P T H

A76-12635 * Stress modification of the toxicity of anti motion sickness drugs and Aspirin. D Shields, C Marra, A Goodwin, and J Vernikos-Danellis (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.) *Pharmacology*, vol 13, 1975, p 241-247 23 refs

The effect of environmental temperature on the toxicity of cyclizine, trimethobenzamide, and Aspirin were studied in mice. LD-50s were compared at 30 C, 22 C, and 15 C. At 30 C the toxicity of all three drugs increased, with that to Aspirin being affected most. Cooling decreased the toxicity of cyclizine and had no significant effect on that of trimethobenzamide or aspirin. These findings indicate that alterations in environmental temperature markedly affect drug toxicity. They emphasize that such alterations, and particularly increases in temperature, do not have to be particularly drastic, but that 'mild' variations in the environment are effective in altering an animal's sensitivity to a drug.

(Author)

STAR ENTRIES

N76-10695*# Food and Drug Administration Cincinnati Ohio
**ECOLOGY AND THERMAL INACTIVATION OF MICROBES
 IN AND ON INTERPLANETARY SPACE VEHICLE COMPO-
 NENTS** Quarterly Progress Report, 1 Jan - 31 Mar 1975
 A L Reyes and J E Campbell Jun 1975 11 p
 (NASA Order W-13411)
 (NASA-CR-145480 QPR-40) Avail NTIS HC \$3 25 CSCL
 O6M

Dry heat treatment is specified as the preferred means for the terminal sterilization of spacecraft and for decontamination of spacecraft components. The presence of organisms highly resistant to dry heat in soil and fallout around assembly and industrial manufacturing areas is shown. The dry heat survival characteristics of the Cape Kennedy isolate 4-6 B brevis spores is demonstrated. The presence of hardy organisms from soil samples obtained from geographical areas of the United States is shown. A resistant fraction appears to occur in low numbers in a soil sample. The heat resistance characteristics of 4-6 B brevis and B subtilis var niger spores are compared. Their morphological characteristics are compared by scanning electron microscopy. Author

N76-10696*# Kanner (Leo) Associates Redwood City Calif
**STARVATION AND REFEEDING OF CARP (CYPRINUS
 CARPIO L)**
 Y Creach and A Serfaty Washington NASA Nov 1975
 25 p refs Transl into ENGLISH from J Physiol (Paris) v 68
 no 3, 1974 p 245-260
 (Contract NASw-2790)
 (NASA-TT-F-16649) Avail NTIS HC \$3 25 CSCL O6C

The main findings on the biochemical changes produced by prolonged total starvation of carp are described. The physiological effects are pointed out in regard to body protein utilization, amino acid metabolism and the problem of fish refeeding after acute starvation. Author

N76-10697*# National Aeronautics and Space Administration
 National Space Technology Labs Bay Saint Louis Miss
**WATER HYACINTHS FOR UPGRADING SEWAGE LA-
 GOONS TO MEET ADVANCED WASTEWATER TREATMENT
 STANDARDS, PART 1**
 B C Wolverton and R C McDonald Oct 1975 9 p refs
 (NASA-TM-X-72729) Avail NTIS HC \$3 25 CSCL O6C

Water hyacinths, Eichhornia crassipes Mart Solms have demonstrated the ability to function as an efficient and inexpensive final filtration system in a secondary domestic sewage lagoon during a three month test period. These plants reduced the suspended solids, biochemical oxygen demanding substances and other chemical parameters to levels below the standards set by the state pollution control agency. The water hyacinth-covered secondary lagoon utilized in this experiment had a surface area of 0.28 hectare (0.70 acre) with a total capacity of 6.8 million liters (1.5 million gallons) receiving an inflow of 522 100 liters (115,000 gallons) per day from a 1.1 hectare (3.8 acre) aerated primary sewage lagoon. These conditions allowed a retention time of 14 to 21 days depending on the water hyacinth evapotranspiration rates. The desired purity of final sewage effluent can be controlled by the water hyacinth surface area, harvest rate and the retention time. Author

N76-10698*# Hawaii Univ, Honolulu Botany Dept
**THE PERFORMANCE AND CAPABILITIES OF TER-
 RESTRIAL ORGANISMS IN EXTREME AND UNUSUAL
 GASEOUS AND LIQUID ENVIRONMENTS PERFORMANCE
 OF FUNGI IN EXOTIC AND HARSH ENVIRONMENTS**
 Semiannual Report
 Sanford M Siegel Oct 1975 29 p refs
 (Grant NGL-12-001-042)
 (NASA-CR-145395 Paper-40) Avail NTIS HC \$3 75 CSCL
 O6C

The growth of Penicillium in saline and low temperature conditions during a 15 month incubation period was studied. Data are also given on the potential of fungi for modification of the surface geochemistry of the earth and the capacity of these fungi to solubilize and concentrate metals. Author

N76-10699# Los Alamos Scientific Lab, N Mex
**EVALUATION OF LITHIUM BORATE AS A 7000-R DOSIME-
 TER**
 D M Holm and R J Payne Apr 1975 6 p refs
 (Contract W-7405-eng-36)
 (LA-5927-MS) Avail NTIS HC \$4 00

A lithium borate dosimeter was evaluated as a 7000-R dosimetry system. One hundred dosimeter cards having two dosimeters per card were irradiated by a 250-keV X-ray machine. A twofold change in calibration was observed during the course of 98 irradiation cycles and a decrease in light output versus time lag between irradiation and reading was observed. The first card failed on the 36th cycle and only two cards survived to the 98th cycle. All of the failures were due to damage of the Teflon packaging causing the dosimeters to hang up in the readout or to move in their card. This system could be used for screwworm fly dosimetry but is not considered ideal.

Author (NSA)

N76-10700# Environmental Protection Agency Cincinnati Ohio
 Office of Water Program Operations
PLANKTON ANALYSIS TRAINING MANUAL Final Report
 R M Sinclair Mar 1975 265 p refs
 (PB-242008/1, EPA-430/1-75-004) Avail NTIS HC \$8 50
 CSCL O6F

The manual covers the broad field of plankton analysis including reference outlines on classification and identification of algae and zooplankton, limnology of plankton techniques of collection, and laboratory methods of analysis. GRA

N76-10703# Royal Aircraft Establishment Farnborough
 (England)

**FRACTURES OF THE SPINE IN HELICOPTER ACCIDENTS
 (EXAMINATION OF 25 CASES)**

R P Delahaye, R Carre, R Auffret, and Farand Jul 1975
 10 p refs Transl into ENGLISH from Rev Med Aeronaut et
 Spatiale (France) v 7 no 26, 1968 p 131-133
 (RAE-Lib-Trans-1848 BR48896) Avail NTIS HC \$3 25

Fractures of the spine were observed in the survivors of helicopter accidents. The different types of crashes are described and some of the characteristic observations are reported. The positions of the fractures and their pathogenic mechanisms are considered. Author

N76-10704*# Transemanatics Inc Washington, D C
**MEASUREMENTS OF LYSOSOMAL ENZYME ACTIVITIES
 AND LAUCINE INCORPORATION RATES IN THE BRAINS
 OF YOUNG AND OLD RATS AFTER APPLICATIONS OF
 PIRACETAM**

D Platt, H Hering, and F J Hering Washington NASA Nov
 1975 13 p refs Transl into ENGLISH from Arzneim Forsch
 Drug Research (West Germany), v 24 no 10, 1974
 p 1588-1590
 (Contract NASw-2792)
 (NASA-TT-F-16653) Avail NTIS HC \$3 25 CSCL O6C

The activities were measured of three lysosomal enzymes: beta-glucuronidase, beta-acetylglucosaminidase, cathepsin D and the incorporation rate of C-14-D-leucine of the brains of young

and old rats after the application of 2-oxo-pyrrolidin-1-acetamid (piracetam) The results demonstrate an increase of the incorporation rate as well as an increase of the protein concentration in the lysosomal sediment of young and old rats The activities of the catabolic lysosomal enzymes decrease in all investigated groups The results are discussed Author

N76-10705*# Techtran Corp Silver Spring Md
X-RAY INVESTIGATION IN AVIATION AND SPACE MEDICINE

A R Mansurov Washington NASA Oct 1975 91 p refs Transl into ENGLISH of the book "Tashkent" USSR, Meditsina Press, 1971 p 1-166 (Contract NASw-2485) (NASA-TT-F-804) Avail NTIS HC \$4 75 CSCL 06S

The history of the use of X-rays to study the effects produced in animals and man by g-forces oriented in various directions is presented with reference of Soviet and foreign literature Frequent comparisons are drawn between the effects on unprotected organisms and parts of the body and the same effects ameliorated by the use of pressurized clothing and special g-suits Data drawn from examinations of professional aviators and parachute jumpers are employed in a survey placing special emphasis on spinal changes and damage caused by landing after ejection or making a jump Author

N76-10706*# Umpqua Research Co Myrtle Creek, Ore
EXPERIMENTAL STUDY OF THE CONSTITUENTS OF SPACE WASH WATER Final Report

David F Putnam and Gerald V Colombo Sep 1975 79 p refs (Contract NAS2-8239) (NASA-CR-137735 URC-50801) Avail NTIS HC \$4 75 CSCL 06P

This report presents experimental data obtained under controlled conditions which quantify the various constituents of human origin that may be expected in space wash water The experiments were conducted with a simulated crew of two male and two female subjects The data show that the expected wash water contaminants originating from human secretions are substantially lower than theoretical projections indicated The data presented are immediately useful and may have considerable impact on the tradeoff comparisons among various unit processes and systems under consideration by NASA for recycling space wash water Author

N76-10707*# Air Force Academy Colo Instrumentation Lab

ANALYSIS OF CHANGES IN LEG VOLUME PARAMETERS, AND ORTHOSTATIC TOLERANCE IN RESPONSE TO LOWER BODY NEGATIVE PRESSURE DURING 59 DAYS EXPOSURE TO ZERO GRAVITY SKYLAB 3

Richard D Barnett Richard J Gowen and David R Carroll Jul 1975 300 p refs (NASA Order T-66344-G) (NASA-CR-144515) Avail NTIS HC \$8 75 CSCL 06S

The cardiovascular responses of the Apollo crewmen associated with postflight evaluations indicate varying decrements of orthostatic tolerance The postflight changes indicate a slightly diminished ability to the cardiovascular system to function effectively against gravity following exposure to weightlessness The objective of the Skylab LBNP experiments (M092) was to provide information about the magnitude and time course of the cardiovascular changes associated with prolonged periods of exposure to weightlessness This report details the equipment signal processing and analysis of the leg volume data obtained from the M092 experiment of the Skylab 3 Mission Author

N76-10708# Institute for Perception RVO-TNO, Soesterberg (Netherlands)

REPORT OF THE WORKING PARTY ON STANDARDIZATION OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

J J Vos 1975 14 p (IZF-1975-7, TDCK-66457) Avail NTIS HC \$3 25

Members of the working party gave their judgment on the performance of color vision tests (Ishihara HRR TMC, Dvorine Farnsworth F2 Farnsworth dichotomous D15, Farnsworth H100 and Anomaloscopes Nagel I and II) and on problems of nomenclature The results are discussed and a suggestion is made to set up a list of registered color vision tests with documented performance as a possibly useful step towards standardized color vision tests Author (ESA)

N76-10709# Naval Medical Research Inst Bethesda Md
HUMAN ENGINEERING CONSIDERATIONS IN THE EVALUATION OF DIVING EQUIPMENT Medical Research Progress Report

A J Bachrach and G H Egstrom 1974 18 p refs Submitted for publication (AD-A011680) Avail NTIS CSCL 06/11

Highlights are presented of a particular human factors approach to one aspect of diver performance - the assessment of diving equipment its impact on the divers work and to a degree, his physiological state Briefly reported are a range-of-motion biomechanical analysis of the flexibility of the two systems and a heart rate-work correlation comparison of the two systems GRA

N76-10710# Harvard Medical School Boston Mass Dept of Physiology

REGULATION OF PROTEIN AND AMINO ACID DEGRADATION IN SKELETAL MUSCLE

Alfred L Goldberg and Richard Odessey 1974 15 p refs Presented at Proc of Intern Conf, Carefree Ariz, 15-19 Oct 1973 Submitted for publication (Grant AF-AFOSR-1807-69)

(AD-A011508 ISBN-90-21902265) Avail NTIS CSCL 06/1

The article reviews recent investigations on the following aspects of protein metabolism in muscle (1) In muscle the average rates of protein catabolism vary under different physiological conditions e.g fasting Several factors have been found to reduce protein catabolism including insulin glucose and branched chain amino acids In addition repeated contractions and passive tension on the muscle retard net proteolysis (2) Muscle rapidly oxidizes 3 required amino acids - leucine isoleucine and valine This process increases severalfold upon fasting in diabetes and after hypophysectomy (3) Muscle releases into the circulation large amounts of alanine This process is linked to degradation of the branched chain amino acids Since alanine is a major precursor for glucose synthesis in liver and since liver releases branched chain amino acids selectively during gluconeogenesis there appears to be a cycle between muscle and liver of branched chain amino acids and alanine GRA

N76-10711# Rochester Univ NY Div of Urology
THE PATHOPHYSIOLOGY OF DECOMPRESSION SICKNESS AN OVERVIEW WITH EMPHASIS ON PLASMA AND LIPID CHANGES Final Report

Abraham T K Cockett Stephen M Pauley, Donald N Zehl and Willia S Cockett 30 May 1975 17 p refs (Contract N00014-67-A-0398-0008, NR Proj 201-011) (AD-A011153, Rept-5-29192) Avail NTIS CSCL 06/19

Several significant findings or trends have been noted over the past 12 years Lipid emboli coexist with gaseous emboli in moderately severe decompression sickness Lipid emboli can be altered following early intravenous therapy Dextran (LMW or MMW) is effective as an antilipemic clearing agent An excellent colloidal expander dextran should be used in the treatment of severe decompression sickness particularly if a recompression chamber is miles away Human divers may manifest changes in hematocrit, platelet and selected coagulation factors These trends are of interest and can perhaps herald the onset of decompression sickness if the plasma changes are significantly altered beyond the levels shown by volunteer divers The lungs serve as a primary target organ for trapping emboli Disruption of alveoli at this site may lead to air embolism Careful monitoring of the brain and eyeground can be of assistance in following the more severely afflicted patient GRA

**N76-10712# Army Edgewood Arsenal Md
RESPIRATORY RESISTANCE AND THE ENDURANCE OF
MEN WORKING UNDER THERMAL STRESS Technical
Report, Dec 1973 - Jul 1974**

Francis N Craig and Fred W Stemler May 1975 30 p refs
(DA Proj 1W7-62710-AD-25)

(AD-A011261 EB-TR-75025) Avail NTIS CSCL 05/5

The effect of the respiratory resistances of the M17A1 protective mask on endurance in hard work of five men wearing the two-layer permeable protective assembly was tested by comparing the standard mask with one whose inspiratory and expiratory resistances were 3 mm H₂O at an airflow of 85 liters per minute. Four comparisons were made at 18C nine at 41C and three at 46C in walking at 3 mph or jogging at 4 mph both up a 10 percent grade. The 3-mph walks represented a workload of from one-third to one-half the measured maximal oxygen uptake. The physiological state at exhaustion was examined in terms of the heart rate, rectal temperature and the time devoted to the expiratory phase of the respiratory cycle. For men walking at 3 mph up a 10 percent grade the heat load of the permeable protective assembly restricts endurance at environmental temperatures of 18C and above. The respiratory stress of the M17A1 protective mask does not add significantly to the restriction on endurance under these conditions. GRA

**N76-10713# School of Aerospace Medicine Brooks AFB Tex
INFLIGHT PATIENT MONITORING/BLOOD PRESSURE
MEASUREMENT DEVICE Final Report, Jun 1970 - Jul
1974**

Helen D Kopczynski David L Stoner and George A Rex May 1975 13 p

(AF Proj 4054)

(AD-A011608 SAM-TR-75-9) Avail NTIS CSCL 06/12

The blood pressure measurement device was designed to meet an urgent operational requirement for a method of monitoring vital signs of acutely ill patients while in flight. The high noise and vibration levels of most aircraft make the indirect measurement of blood pressure extremely difficult using the conventional approach. The Military Airlift Command (MAC) requested development of a device which would overcome these constraints. A method using an ultrasonic monitoring device that employs the Doppler shift principle to detect blood flow and arterial wall motion was developed by USAFSAM. The inflight blood pressure measurement device consists of a commercial ultrasonic Doppler shift monitor and a standard sphygmomanometer which has been modified by placing a transducer mount through the cuff and bladder. The device is employed similarly to an acoustic stethoscope and sphygmomanometer. GRA

**N76-10714# Maryland Univ College Park
CELLULAR VIABILITY, METABOLISM AND GROWTH
KINETICS DURING HYPERTHERMIA IN THE PHYSIOLOGI-
CAL RANGE Final Report, 18 Jun 1973 - 31 Aug 1974**

Joshua R C Brown 23 May 1975 12 p refs

(Grant DA-ARO(D)-31-124-73-G196)

(AD-A011484 FR-3 ARO-115563-L) Avail NTIS CSCL 06/19

The objectives of the project are to (1) establish a dose response curve to hyperthermia between normal incubation temperature and 40.5C (2) to investigate the mechanisms of thermal disruption of normal cellular activities and attempt to correlate temperature induced effects with changes in high energy nucleotide availability or with the levels of other metabolic regulators (3) to investigate the mechanisms of increased thermal stability in previously heat treated cell cultures. A brief outline of research findings is presented. GRA

**N76-10715# Maryland Univ College Park
CELLULAR VIABILITY, METABOLISM AND GROWTH
KINETICS DURING HYPERTHERMIA IN THE PHYSIOLOGI-
CAL RANGE Final Report, 1 Feb 1972 - 31 Aug 1974**

Joshua R C Brown 23 May 1975 11 p refs

(Grant DAHC19-72-G-0010)

(AD-A011482 ARO-115562-L FR-2) Avail NTIS CSCL 06/19

A study of the effect of a 12-hour incubation at 40.5C on population growth, mitotic index, cell viability and rate of incorporation of 3H-thymidine into DNA, 3H-leucine into protein and inorganic 32P into high energy nucleotides is presented. A summary of results of this investigation is given. GRA

**N76-10716# Turku Univ (Finland) Dept of Medical
Chemistry**

**OXYGEN AND TRAUMA STUDIES ON PULMONARY
OXYGEN POISONING AND THE ROLE OF OXYGEN IN
REPAIR PROCESSES Final Technical Report, Dec 1973 -
Dec 1974**

Juha Niinikoski Dec 1974 90 p refs

(Grant DA-ERO-124-74-G-0011)

(AD-A011408, ARDGE(E)-R/D-2026) Avail NTIS CSCL 06/5

Contents: oxygen-induced changes in pulmonary phospholipids; collagen metabolism in rat lungs during chronic intermittent exposure to oxygen; Determinations of local O₂ and CO₂ tensions by means of implanted silastic tube; parenchymal gas tensions in dog lung; intraperitoneal O₂ and CO₂ tensions in experimental adhesion disease and peritonitis; energy metabolism of experimental wounds in various oxygen environments; effect of hyperbaric oxygenation and prolonged hypoxia on healing of open wounds; oxygen tensions in healing anastomosis of rabbit aorta. GRA

**N76-10717# Aerospace Medical Research Labs Wright-
Patterson AFB Ohio**

**EFFECTS OF MONOMETHYLHYDRAZINE ON RED BLOOD
CELL METABOLISM**

Marilyn E George Mar 1975 20 p refs

(AF Proj 7163)

(AD-A011548 AMRL-TR-74-87) Avail NTIS CSCL 06/20

Monomethylhydrazine is used in various Air Force propellant systems. Chronic exposure to low concentrations of this compound results in an anemia characterized by methemoglobinemia, decreased levels of reduced glutathione and Heinz body formation. The study reported here was designed to determine if Heinz body formation was the principal mechanism of the red cell destruction or if MMH also had effects on the glycolytic pathways and/or red cell membranes which would contribute to the hemolytic mechanism. Human red cells were exposed in vitro to three levels of MMH for two four or six hours. Glucose utilization, lactate production and ATP levels were measured to determine effects on glucose metabolism and osmotic fragilities; red cell potassium concentration and malonyldialdehyde levels were measured to assess membrane effects. GRA

N76-10718# California Univ Irvine

**TOXIC HAZARDS RESEARCH UNIT ANNUAL TECHNICAL
REPORT, 1974 Final Report, Jun 1973 - May 1974**

J D MacEwen and E H Vernot Jul 1974 203 p refs

(Contract F33615-73-C-4059 AF Proj 6302)

(AD-A011559 AMRL-TR-74-78) Avail NTIS CSCL 06/20

Acute inhalation toxicity experiments were conducted on benzonitrile, deuterium fluoride and fluomine. Chronic toxicity studies were conducted with an aircraft fuel JP-4 and constituents of JP-9. Chronic studies of coal tar aerosols and hydrazine were also continued. Oral and percutaneous toxicity determination and skin irritation and sensitization studies were conducted on a number of fuel additives and photographic chemicals. GRA

**N76-10719# Undersea Medical Society Bethesda Md
PROCEEDINGS OF THE UNDERSEA MEDICAL SOCIETY
WORKSHOP (8TH) ON THE STRATEGY FOR FUTURE
DIVING TO DEPTHS GREATER THAN 1,000 FEET**

M J Halsey W Settle and E B Smith 15 Jun 1975 104 p refs. Workshop held at Sea Ranch Calif 26-27 Feb 1975

(Contract N00014-74-C-0319)

(AD-A011456 WS-6-15-75) Avail NTIS CSCL 06/19

The report presents discussions dealing with all aspects of the subject problem. The following areas were stressed: Physico-chemical approaches; interaction of anaesthetics with proteins and bilayers; pressure and anaesthetics performance during saturation dives; hydrostatic pressure effects in liquid

breathing mice sustained dives with mice up to depths of 8000 feet application of the critical volume hypothesis to problems of deep diving high pressure nervous syndrome--clinical and electrophysiological studies in man, practical limits to the use of man under pressure and a strategy for future diving GRA

N76-10720# School of Aerospace Medicine Brooks AFB, Tex
OCULAR HYPERTENSION AND CHRONIC OPEN-ANGLE GLAUCOMA IN USAF PILOTS AND NAVIGATORS Progress Report, 1958 - 1973

James L Mims III and Thomas J Tredici Dec 1974 18 p refs

(AF Proj 7755)

(AD-A010588 SAM-TR-74-48) Avail NTIS CSCL 06/14

Records from the United States Air Force glaucoma screening and management program for flying personnel were surveyed to obtain long-term followup information and age-specific prevalences for this population Untreated ocular hypertensives with tensions of 22-29 with no visual field loss were labeled preglaucoma ocular hypertensives without field loss and treated with epinephrine (for tensions above 29 or for other reasons) were labeled glaucoma Those requiring other drugs and those with field loss were disqualified from flying Questionnaires to ophthalmologists caring for retired men indicated that 1 of the 39 preglaucomas followed 8 years and 2 of the 27 glaucomas followed 7 years had lost visual field Among ocular hypertensives screened from 15 804 men ages 40-54 in 1970 only 5 had visual field loss presumed glaucomatous GRA

N76-10721*# McDonnell-Douglas Technical Services Co Inc Houston Tex
ADVANCED CREW PROCEDURES DEVELOPMENT TECHNIQUES PROCEDURES AND PERFORMANCE PROGRAM TRAINING PLAN

J D Arbet and R L Benbow 17 Oct 1975 13 p

(Contract NAS9-14354)

(NASA-CR-144526 ACPDT-DN-13) Avail NTIS HC \$3 25 CSCL 05I

A plan developed to support the training of PPP users in the operations associated with PPP usage is described This document contains an overview of the contents of each training session and a detailed outline to be used as the guideline for each session Author

N76-10722# Institute for Perception RVO-TNO Soesterberg (Netherlands)

THE COMPROMISE BETWEEN VISUAL FIELD AND MAGNIFICATION FOR AN IMAGE INTENSIFIER WITH VARIABLE MAGNIFICATION

F L vanOs and R E vanLeeuwen 1975 12 p ref In DUTCH ENGLISH summary

(Contract A74/KL/013)

(IZF-1975-6 TDCK-66456) Avail NTIS HC \$3 25

The optimal combination of magnification and visual field for an image intensifier with a zoom lens was determined This was done with an indoor simulation of the realistic target search task of finding on a slide a jeep near the edge of a forest The search time appeared to be the best yardstick to find an optimal magnification A tentative interpretation of the data was given

Author (ESA)

N76-10723# Aerospace Medical Research Labs Wright-Patterson AFB Ohio

SEEKVAL PROJECT IA1 EFFECTS OF TARGET NUMBER AND CLUTTER ON STATIC TARGET ACQUISITION Final Report

Robert L Hilgendorf and John Milenski Jul 1974 50 p refs (AF Proj 7184)

(AD-A011546 AMRL-TR-74-14) Avail NTIS CSCL 05/10

The report covers an experiment to determine the effects of number of targets and background clutter on static, low altitude target detection performance by the unaided eye as would be experienced in a helicopter-type target acquisition environment The data consist mainly of whether or not single or groups of tank targets (3 or 9) within controlled clutter configurations were detected and the corresponding times to detect them

Statistical methods are employed to assess the effects of target and clutter factors on detection performance GRA

N76-10724# Aerospace Medical Research Labs Wright-Patterson AFB, Ohio

SEEKVAL PROJECT IA1 EFFECTS OF COLOR AND BRIGHTNESS CONTRAST ON TARGET ACQUISITION Final Report

Robert L Hilgendorf and John Milenski Jul 1974 75 p refs (AF Proj 7184)

(AD-A011547 AMRL-TR-74-55) Avail NTIS CSCL 05/10

The report covers an experiment to determine the effects of target color and brightness contrast on visual detection performance by means of the unaided human eye The data consist mainly of elapsed times between search initiation and correct detection of tank targets at a simulated slant range of about 1 mile Statistical methods are employed to assess the effects of color with three levels of contrast factor on detection performance Under the experimental conditions effects due to color and brightness contrast were each statistically rated with the observation that interaction effects between these two factors were not statistically significant The effect of color tended to account for more variance than the effect of brightness contrast GRA

N76-10725# School of Aerospace Medicine Brooks AFB Tex Aerospace Medical Div

EVALUATION OF TWO LINK GAT-1 TRAINER TASKS BY EXPERIENCED PILOTS AT THREE ALCOHOL DOSE LEVELS Final Report, Mar 1973 - Jun 1974

Peter H Henry Thomas Q Davis Edward J Engelken Richard C McNeen Harold N Keiser J H Triebwasser and M C Lancaster Dec 1974 156 p refs

(AF Proj 7930)

(AD-A011607 SAM-TR-74-53) Avail NTIS CSCL 05/10

To calibrate the performance measuring scales for two separate tasks developed around the Link GAT-1 flight trainer the degrading effects of ethyl alcohol were studied in 12 USAF instructor pilots The subjects were tested at three alcohol dose levels (0.3 0.6 and 0.9 gm alcohol/kg body wt) which resulted in indirectly measured blood alcohol levels of approximately 30, 60 and 100 mg% respectively Statistically significant performance decrements were found for only the moderate and high alcohol dose levels The magnitudes of the decrements corresponded closely to those reported in previous experiments using the same test conditions but where the subjects had no previous flying experience GRA

N76-10726# Arizona State Univ Tempe Dept of Educational Technology

PRACTICE AND INCENTIVE EFFECTS ON LEARNER PERFORMANCE AIRCRAFT INSTRUMENT COMPREHENSION TASK Final Report, Jun 1973 - Jul 1974

Barbara G Tenpas and Norman C Higgins Dec 1974 30 p refs

(Contract F41609-71-C-0027 AF Proj 1123)

(AD-A011616 AFHRL-TR-74-104) Avail NTIS CSCL 05/9

AFOTC cadets learned an aircraft instrument comprehension task by reading self-instructional materials No significant changes in posttest scores occurred when practice items were added to the materials or when simulator rides were offered as incentives However cadets who practiced the task and cadets who were offered the incentive performed faster on the posttest than those who only read the materials GRA

N76-10727# Eastern Virginia Medical School Norfolk Dept of Physiology and Bioengineering

MODULATION OF EVOKED RESPONSES DURING BEHAVIORAL MOTOR INHIBITION IN THE CAT Annual Summary Report, 1 Mar 1974 - 28 Feb 1975

Richard C Howe 21 Mar 1975 8 p

(Grant DAMD17-74-G-9390)

(AD-A011457 ASR-1) Avail NTIS CSCL 06/16

The purpose of this study was to ascertain those brain systems directly associated with inhibition of motor activity Chronic

cats with implanted electrodes were operantly conditioned for an absence of phasic motor activity. Peripherally and centrally evoked responses are obtained from the implanted electrodes during movement non-movement and sleep periods. All electrode sites are verified using histological techniques. Standard computer signal averaging techniques are used in the data analysis. Amplitude changes of evoked responses from various brain structures will be compared between movement non-movement and sleep states. As the data collection phase is still in progress no results are presently available. Interpretation of the results will be made according to the structural and functional organization of those brain areas showing significant alterations during the behavioral conditions of this study. GRA

N76-10728# Assistant Secretary of Defense (Program Analysis and Evaluation) Washington D C
EFFECTS OF COLORED LENSES ON VISUAL PERFORMANCE Final Report, 1 Feb 1973 - 30 Jan 1974

Robert S Hart Jul 1974 24 p refs
 (Contract F33615-73-C-4105 AF Proj 7184)
 (AD-A011572 AMRL-TR-74-38) Avail NTIS CSCL 17/8

This study compares operator target detection performance while wearing red, yellow and gray sunglass lenses and unaided viewing. A research task was performed outdoors using survival orange targets located at ranges of 1600 feet to 4500 feet from the subjects. No statistically significant performance differences were obtained although subjectively the operators preferred the yellow lenses over the gray sunglasses and unfiltered conditions. GRA

N76-10729# Aerospace Medical Research Labs Wright-Patterson AFB Ohio

THE EFFECTS OF EXTENDED MISSIONS ON THE PERFORMANCE OF AIRBORNE COMMAND AND CONTROL TEAMS Final Report

Robert D ODonnell Ralph Bollinger and Bryce O Hartman Jul 1974 32 p
 (AF Proj 7184)
 (AD-A011549 AMRL-TR-74-20) Avail NTIS CSCL 05/10

The report covers the effects of extended mission lengths on the performance of airborne command and control teams wherein complex cognitive components consisting primarily of information collection interpretation and communication constitute the bulk of the workload. The survey centers on investigating general categories of performance-related factors such as overall fatigue rather than specific task performances such as long-term memory sensory motor reaction time, or information processing. GRA

N76-10730# Illinois Univ Savoy Aviation Research Lab
THE TRANSITION OF EXPERIENCED PILOTS TO A FREQUENCY-SEPARATED AIRCRAFT ATTITUDE DISPLAY A FLIGHT EXPERIMENT Final Report

Dennis B Beringer Robert C Williges, and Stanley N Roscoe Jul 1974 25 p refs
 (Contract N00014-67-A-0305-0014 NR Proj 196-092)
 (AD-A001808 ARL-74-8/ONR-74-1) Avail NTIS CSCL 05/5

Twenty-four experienced pilots were given one flight in a Link GAT-2 simulator and one flight in a Beechcraft C-45H using either the moving horizon moving airplane or frequency-separated attitude display. The flight tasks performed by the subjects included recovery from unknown attitudes disturbed attitude tracking and completion of an area navigation course. Data collected in the C-45H aircraft demonstrated superior performance of both the frequency-separated and moving horizon displays when compared to the moving airplane display during unknown attitude recoveries. The frequency-separated display was superior to all others during disturbed-attitude tracking. It was concluded that the flight performance of experienced pilots during their initial transition to a frequency-separated flight attitude presentation is at least comparable and possibly superior to their flight performance with the conventional moving horizon presentation. GRA

N76-10731*# Honeywell Inc Minneapolis Minn
CABIN ATMOSPHERE MONITORING SYSTEM (CAMS), PRE-PROTOTYPE MODEL DEVELOPMENT CONTINUATION

Summary Report, Aug 1974 - Jun 1975
 W W Bursack and W A Harris Jun 1975 32 p
 (Contract NAS8-30254)
 (NASA-CR-144005 Honeywell-SR-F2107-1) Avail NTIS HC \$3 75 CSCL 06K

The development of the Cabin Atmosphere Monitoring System (CAMS) is described. Attention was directed toward improving stability and reliability of the design using flight application guidelines. Considerable effort was devoted to the development of a temperature-stable RF/DC generator used for excitation of the quadrupole mass filter. Minor design changes were made in the preprototype model. Specific gas measurement examples are included along with a discussion of the measurement rationale employed. Author

N76-10732*# Aerotherm Acurex Corp Mountain View Calif
EV SPACE SUIT GLOVES (PASSIVE) Final Report

F Glenn Tickner E G Fletcher J D Dodson and William Elkins Sep 1975 145 p refs
 (Contract NAS9-14461 Aerotherm Proj 7122)
 (NASA-CR-144527, Aerotherm-75-165) Avail NTIS HC \$5 75 CSCL 06K

A pair of pressure and thermal insulating overgloves to be used with an Extravehicular (EV) suit assembly was designed, developed, fabricated and tested. The design features extensive use of Nomex felt materials in lieu of the multiple layer insulation formerly used with the Apollo thermal glove. The glove theoretically satisfies all of the thermal requirements. The presence of the thermal glove does not degrade pressure glove functionality by more than the acceptable 10% value. On the other hand the thermal glove generally degrades pressure glove mobility by more than the acceptable 10% value primarily in the area of the fingers. Life cycling tests were completed with minimal problems. The thermal glove/pressure glove ensemble was also tested for comfort; the test subjects found no problems with the thermal glove although they did report difficulties with pressure points on the pressure glove which were independent of the thermal glove. Y J A

N76-10733*# Life Systems Inc Cleveland Ohio
ELECTROCHEMICAL AIR REVITALIZATION SYSTEM OPTIMIZATION INVESTIGATION Final Report

R R Woods F H Schubert and T M Hallick Oct 1975 93 p refs
 (Contract NAS9-14301)
 (NASA-CR-144521 LSI-ER-247-3) Avail NTIS HC \$4 75 CSCL 06K

A program to characterize a Breadboard of an Electrochemical Air Revitalization System (BEARS) was successfully completed. The BEARS is composed of three components: (1) a water vapor electrolysis module (WVEM) for O₂ production and partial humidity control; (2) an electrochemical depolarized carbon dioxide concentrator module (EDCM) for CO₂ control; and (3) a power-sharing controller designed to utilize the power produced by the EDCM to partially offset the WVEM power requirements. It is concluded from the results of this work that the concept of electrochemical air revitalization with power-sharing is a viable solution to the problem of providing a localized topping force for O₂ generation, CO₂ removal and partial humidity control aboard manned spacecraft. Continued development of the EARS concept is recommended, applying the operational experience and limits identified during the BEARS program to testing of a one-man capacity system and toward the development of advanced system controls to optimize EARS operation for given interfaces and requirements. Successful completion of this development will produce timely technology necessary to plan future advanced environmental control and life support system programs and experiments. Author

N76-10734*# McDonnell-Douglas Technical Services Co Inc Houston, Tex
ADVANCED CREW PROCEDURES DEVELOPMENT TECHNIQUES PROCEDURES AND PERFORMANCE PROGRAM DESCRIPTION
 J D Arbet and A A Mangiaracina 26 Sep 1975 110 p refs
 (Contract NAS9-14354)
 (NASA-CP-144517 ACPDT-DN-12) Avail NTIS HC \$5 25 CSCL 05H

The Procedures and Performance Program (PPP) for operation in conjunction with the Shuttle Procedures Simulator (SPS) is described. The PPP user interface the SPS/PPP interface and the PPP applications software are discussed. Author

N76 10735*# Massachusetts Univ Amherst
DESIGN AND FABRICATION OF AN END EFFECTOR Final Report
 F R E Crossley and Franklin G Umholtz 21 May 1975 30 p refs
 (Contract NAS8-29073)
 (NASA-CR-144008) Avail NTIS HC \$3 75 CSCL 05H

The construction is described of a prototype mechanical hand or end effector for use on a remotely controlled robot but with possible application as a prosthetic device. An analysis of hand motions is reported from which it is concluded that the two most important manipulations (apart from grasps) are to be able to pick up a tool and draw it into a nested grip against the palm and to be able to hold a pistol-grip tool such as an electric drill and pull the trigger. A model was tested and found capable of both these operations. Author

N76-10736# Forschungsinstitut fuer Anthropotechnik Meckenheim (West Germany)
AN INVESTIGATION OF SINGLE-AXIS MANUAL CONTROL PROCESSES AND COMPARATIVE EVALUATION OF HUMAN OPERATOR MODELS [VERGLEICHENDE UNTERSUCHUNG EINACHSIGER MANUELLER REGELVORGAENGE UND BEURTEILUNG IHRER LINEAREN MODELLIERUNG]
 W Stein Dec 1974 107 p refs In GERMAN ENGLISH summary
 (FB-21) Avail NTIS HC \$5 25 Forschungsinst fuer Anthropotech Meckenheim West Ger DM 10

Tracking behavior of human operators was investigated for the purpose of describing and modelling that behavior. The independent variables were selected from signal parameters of the random forcing function and control system dynamics of a single-axis laboratory tracking task. The signal transfer and information transmission characteristics of the human operator and his control performance on the task as it varied with independent variables was discussed. Attention was given to intra and intersubject variability of the human operator. A criterion derived from experimental data to assess the efficiency of human operator models is proposed. After review of the literature this criterion was used to compare several selected human operator models including some relatively complex ones with the simple linear time-invariant type of model in terms of their deterministic aspects. It was found that the efficiency of all models was comparable. Author (ESA)

N76-10737# Aerospace Medical Research Labs Wright-Patterson AFB Ohio Aerospace Medical Div
DESIGNING FOR MUSCULAR STRENGTH OF VARIOUS POPULATIONS Final Report
 K H Eberhard Kroemer Dec 1974 58 p refs
 (AF Proj 7184)
 (AD-A011537 AMRL-TR-72-46) Avail NTIS CSCL 05/5

Hand- and foot-operated controls are the input devices through which the operator effects the performance of manned systems. Selection of the type of control and its location within the reach envelope depend to a large degree on biomechanical parameters of all user populations i.e. mainly on their body dimensions and on their strength characteristics including motion stereotypes and lateral preferences. Muscular strength for control operation can vary significantly with age sex cultural origin health training

motivation and other specific traits of the operator population. The paper discusses several of these variables and their biomechanical implications and describes techniques and a regimen to design new equipment or modify existing equipment to conform to the strength characteristics of the operator populations. GRA

N76-10738# Webb Associates Yellow Springs Ohio
THE EFFECTS OF PERSONAL PROTECTIVE EQUIPMENT UPON THE ARM REACH CAPABILITY OF USAF PILOTS
 Milton Alexander and Lloyd Laubach Jul 1973 11 p Submitted for Publication
 (Contract F33615-72-C-1006 AF Proj 7184)
 (AD-A011580 AMRL-TR-72-93) Avail NTIS CSCL 05/5

The lack of published arm-reach data on Air Force flight personnel in actual cockpit situations presents manifest difficulties to the cockpit layout specialist. This paper discusses the results of a study to determine the arm reach capabilities of aircrewmen wearing heavy winter flight clothing survival equipment and restraint harnesses. The sample consisted of 16 male subjects (currently active Air Defense Command pilots). The subjects were (pilots) selected to approximate closely the various height-weight categories in the ADC flying population. A specially designed apparatus was constructed to measure arm-reach capability. Each subject was measured under four conditions. The results of the study indicate that there are significant differences in arm reach capability of pilots while in the shirt-sleeved and maximum flying assembly conditions throughout most of the spatial envelope. GRA

N76-10739# Aerospace Medical Research Labs Wright-Patterson AFB Ohio
HUMAN FORCE CAPABILITIES FOR OPERATING AIRCRAFT CONTROLS AT 1, 3, AND 5 GZ Final Report
 K H Eberhard Kroemer Feb 1975 108 p refs
 (AF Proj 7184)
 (AD-A011545 AMRL-TR-73-54) Avail NTIS CSCL 05/8

The maximum isometric forces adult male subjects could exert at eight locations of hand-operated aircraft controls were measured at 1 +3 and +5gz. Forces were measured in two vertical and four to eight horizontal directions. Selected anthropometric dimensions were obtained on the subjects and compared with those from the 1967 USAF anthropometric survey of flying personnel. Summary statistics including the mean standard deviation coefficient of variation symmetry kurtosis and selected percentiles are presented for each of the 60 force exertion measures. GRA

N76-10740# Naval Air Development Center Warminster Pa Crew Systems Dept
LABORATORY ASSESSMENT OF THE AN/PVS-5 NIGHT VISION GOGGLE
 Gloria T Chisum and Phyllis E Morway 19 Mar 1975 23 p refs
 (AD-A011053 NADC-75006-40) Avail NTIS CSCL 17/5

Laboratory assessment of the AN/PVS-5 Night Vision Goggle was conducted. Visual fields goggle infrared source useable range and detectability of targets with the goggle were measured. Illumination levels of 5.4 and -6.22 log foot candles were adequate for 90 percent detection of 0.14 and 0.07 acuity targets respectively. Calculations of distances at which various surface and airborne targets subtended comparable visual angles and tables of natural brightness conditions are presented to permit translation of laboratory values into field conditions. While further field evaluation is anticipated the laboratory assessment indicates that the goggle can significantly facilitate aircrew night visual performance. GRA

N76-11310 Letterman Army Inst of Research San Francisco, Calif Non-Ionizing Radiation Div
OCULAR EFFECTS OF LASER RADIATION CORNEA AND ANTERIOR CHAMBER
 Edwin S Beatrice and Bruce E Stuck In AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 5 p refs

The effects of infrared laser radiation on the cornea and skin of humans were considered. Three areas were discussed: normal anatomy and physiology of both tissues, summary of those laser systems which may interact with these tissues and effects of these systems on tissues. It is pointed out that threshold damage to the eye from CO₂ laser radiation is confined to the more superficial areas of the cornea. At above threshold levels, damage is observed to the entire thickness and some changes in the anterior chamber are observed. Y J A

N76-11311 Letterman Army Inst of Research, San Francisco, Calif. Non-Iodizing Radiation Div

OCULAR EFFECTS OF RADIATION RETINA

Edwin S Beatrice /In AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 4 p refs

A discussion of threshold levels associated with injuries to the primate retina from exposure to visible and near infrared laser radiation was given. It is explained that, while the retina is subdivided into ten identifiable layers, the absorption site of the visible and near infrared laser sources is limited to the melanin granules of the retinal pigment epithelium. The mechanism of injury at the above threshold exposed site is thermal. The endpoint for the determination of threshold levels can be subdivided into three areas: grossly observable retinal opacity level, light microscopic cellular alteration at the distal photoreceptor and pigment epithelial level, and subcellular change at the magnification power of the electron microscopic level. Y J A

N76-11312 Royal Air Force Inst of Aviation Medicine, Farnborough (England)

DETERMINATION OF SAFE EXPOSURE LEVELS ENERGY CORRELATES OF OCULAR DAMAGE

R G Borland /In AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 6 p refs

Three techniques were used to define practical but safe criteria for use with laser systems. These are: inspection of the eye by optical means (ophthalmoscopy), fluorescein angiography and microscopy (light and electron). The detection of damage is a form of quantal response and the determination of the threshold level is normally based on the energy or power which will result in a given probability of damage being detected. The energy correlates of damage depend on wavelength, pulse width or exposure time, repetition rate, tissue type and pigmentation and ocular quality. This complex relationship necessarily limits experimental research to laser systems of special interest and so the interpolation of data to formulate overall safe exposure levels is necessary. Author

N76-11315 Royal Air Force Inst of Aviation Medicine, Farnborough (England)

OPHTHALMOLOGICAL EXAMINATION OF LASER WORKERS AND INVESTIGATION OF LASER ACCIDENTS

D H Brennan /In AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 11 p ref

Those aspects of ocular structure and function which are relevant to laser induced damage in man were discussed, including the transmission and absorption characteristics of ocular tissues and the natural protective mechanisms of the eye. A scheme for the ocular surveillance of laser workers was presented with an evaluation of the role of the field and other specialized examinations. The procedure to be followed in the event of a laser accident was discussed. It is recommended that this involves a biophysical assessment of the accident with particular reference to energy or power densities which may have been incident on the cornea as well as a detailed ocular examination. This may include fluorescein angiography which has been found to be a more sensitive technique for detection of damage than ophthalmoscopy in monkeys. Author

N76-11316 Army Environmental Hygiene Agency, Aberdeen Proving Ground, Md. Laser Microwave Div

LASER PROTECTIVE DEVICES

David H Sliney /In AGARD Laser Hazards and Safety in the Mil Environ 1975 11 p refs

The ideal characteristics of laser eye protective devices were presented and the present filter materials and goggle designs were compared with the ideal. Although the skin requires protection from lasers emitting in the ultraviolet and far-infrared regions at comparable exposure levels that may cause eye injuries, protection of the eye remains paramount. Author

N76-11647 World Meteorological Organization, Geneva (Switzerland)

HEAT STRESS IN INDIGENOUS CATTLE

V A Finch /In its Agroclimatology of the Highlands of Eastern Africa 1974 p 48-55 refs

Copyright

The heat stress from solar radiation in zebu cattle (*Bos indicus*) in the highlands of East Africa was assessed by evaluating the absorption of radiant energy flux, the metabolic heat production and each mode of heat dissipation. The results suggest that heat stress in zebu cattle is minimal and that production is not hindered by solar radiation. ESA

N76-11685*# Agnew Tech-Tran, Inc., Woodland Hills, Calif. **EVALUATION OF THE ENERGY EXPENDED IN A LEARNING SITUATION (CONDITIONING BASED ON FOOD REINFORCEMENT) BY GOLDFISH (*CARASSIUS AURATUS* L.)**

Michel Anthouard, Washington, NASA, Nov 1975, 10 p refs. Transl into ENGLISH from Bull of the Soc Zoologique de France (Paris) v 97 no 2, 1972, p 205-210. (Contract NASw-2789)

(NASA-TT-F-16650) Avail NTIS HC \$3.50 CSCL 06C

The behavior of fish is studied when placed in a learning situation. It is demonstrated that fish work much more often by pushing than by pulling; moreover, the latter procedure was found to be less efficient. Individual variations observed within the group listed make it possible to envisage the possibility of comparative analysis on the behavior of fish subjected to conditioning, which may result in a characterological study. The results obtained here constitute a basis for evaluating the effect of environmental factors (social or non-social) on attainment. Author

N76-11686*# Agnew Tech-Tran, Inc., Woodland Hills, Calif. **FASTING AND RENOURISHMENT OF CARP (*CYPRINUS CARPIO* L.). 3**

G Bouche, J F Narbonne and A Serfaty, Washington, NASA, Nov 1975, 11 p refs. Transl into ENGLISH from Arch Sci Physiol (Paris) v 26, 1972, p 101-109. (Contract NASw-2789)

(NASA-TT-F-16651) Avail NTIS HC \$3.50 CSCL 06C

The effect of artificial complete fasting of carp on variations of their content of polysomal and ribosomal RNA, as well as of soluble RNA, was investigated. This effect was ascertained by separately weighing the specimens and their livers, as well as by chemical spectrophotometric analysis. A comparison was made of the results obtained for carp which were subjected to artificial fasting followed by renourishment with two separate diets, with those of a control group. Natural seasonal effects were simulated during these experiments. It was found that artificial complete fasting of carp results in major losses in polysomal and ribosomal RNA, while the losses in soluble RNA were less severe. The hepatocytes of renourished carp contained more ribosomal, polysomal and soluble RNA than normally nourished carp. The mortality rate of renourished carp depended on the type of diet. Author

**N76-11687*# Kanner (Leo) Associates, Redwood City, Calif
LOCALIZATION OF 3H-GAMMA-AMINOBUTYRIC ACID IN
THE COCHLEA LIGHT AND ELECTRON MICROSCOPIC
AUTORADIOGRAPHY**

W Richrath H Kraus and H G Fromme Washington NASA
Nov 1975 15 p refs Transl into ENGLISH from Arch
Oto-rhino-Laryng (West Ger) v 208, 1974 p 283-293
(Contract NASw-2790)
(NASA-TT-F-16661) Avail NTIS HC \$3 50 CSCL 06R

Autoradiograms of quinea pig cochleae and brains were
examined microscopically after administration of 3H-GABA to
determine its distribution from the grain density A blood
perilymph barrier in addition to the blood brain barrier was
suggested by a lack of activity in brain and cochlea after
intraarterial injection Cochlear perfusion produced considerable
labeling in the spiral ganglion 3H-GABA activity was only
indicated above glia cells but not above nerve cell bodies or
axons Light microscopy showed selective labeling at efferent
nerve fibers in Corti's organ, only labeling of efferent synapses
was found electron microscopically Silver grains were pre-
dominantly above vesicles and mitochondria Afferent synapses
were unlabeled It is concluded that the efferent system of Corti's
organ contains a high degree of GABA but contradicting previous
electrophysical results make it impossible to determine at this
time that the substance is a transmitter Author

**N76-11688*# Agnew Tech-Tran, Inc., Woodland Hills, Calif
CHLORPROMAZINE, PIRACETAM, AND THE METABOLISM
OF BRAIN PHOSPHOLIPIDS IN THE RAT**

L Rochus and J J Reuse Washington NASA Nov 1975
6 p refs Transl into ENGLISH from Compt Rend Soc Biol
(Masson) v 166, no 6-7, 1972 p 975
(Contract NASw-2789)
(NASA-TT-F-16652) Avail NTIS HC \$3 50 CSCL 06C

The effects of chlorpromazine piracetam and their possible
interaction on the incorporation of radioactively labeled phosphate
in the total phospholipids, as well as in various phospholipidic
fractions of the cerebral cortex of the rat was investigated in
vivo Three different types of experiments were carried out The
first group of rats was injected intraperitoneally with chlorproma-
zine only, the second group with piracetam only and the third
group with both The corresponding effects on the incorporation
of P-32 in the phospholipids of the cerebral cortex are presented
quantitatively in tabular form The results show that chlorpromazine
decreases the incorporation of P-32 Moreover, while piracetam
by itself has little effect, when used in combination with
chlorpromazine it may significantly augment the depressive effect
of the latter Author

**N76-11689*# Agnew Tech-Tran, Inc. Woodland Hills Calif
INFLUENCE OF Zsub 1210 CELL GROWTH OF CELLS
STERILIZED BY IONIZING RADIATIONS**

E P Malaise, Z Detcheva-Ninova and M Tubiana Washington
NASA Nov 1975 6 p refs Transl into ENGLISH from
Compt Rend Acad Bulgare Sci (Sofia) v 28 no 3 1975
p 427-429
(Contract NASw-2789)
(NASA-TT-F-16538) Avail NTIS HC \$3 50 CSCL 06M

Experiments concerning the influence of sterilized cells on L
sub 1210 cell growth were performed Mice were injected either
subcutaneously or intra-peritoneally with certain cells some were
also previously exposed to radiation Tumor growth was monitored
as well as the survival periods of the mice after injection
Author

**N76-11690*# Agnew Tech-Tran, Inc., Woodland Hills Calif
MOLECULAR MEMORY?**

A Pfeiffer Washington NASA Nov 1975 9 p refs Transl
into ENGLISH from Studia Biophysica (Berlin) v 46 no 2
1974 p 131-136
(Contract NASw-2789)
(NASA-TT-F-16654) Avail NTIS HC \$3 50 CSCL 06P

An explanation for the partially contradictory results of
chemical examination of certain conditioned reflexes in animals
is given, which rests on the assumption of a chemical specificity

of the connector substances within the synaptic terminals of
axons of varying origin, and which are thought to be effective
during the learning process, as opposed to the assumption of a
chemical structure of these substances which would be dependent
on a memory content requiring individual definition in each
case Author

**N76-11691*# Martin Marietta Corp., Houston, Tex Aerospace
Group**

**INTEGRATED LIFE SCIENCES TECHNOLOGY UTILIZATION
DEVELOPMENT PROGRAM Final Report, 1 Jun 1974 -
10 Oct 1975**

Oct 1975 34 p
(Contract NAS9-14215)
(NASA-CR-144545) Avail NTIS HC \$4 00 CSCL 06B

The goal of the TU program was to maximize the development
of operable hardware and systems which will be of substantial
benefit to the public Five working prototypes were developed
and a meal system for the elderly is now undergoing evaluation
Manpower utilization is shown relative to the volume of
requests in work for each month The ASTP mobile laboratories
and post Skylab bedrest study are also described Author

**N76-11692*# Harvard Univ., Cambridge, Mass
M-071 CRITICAL DATA ANALYSIS Final Technical Report,
27 Jun 1973 - 31 Dec 1975.**

D M Hegsted 31 Dec 1975 122 p refs
(Contract NAS9-13370)
(NASA-CR-145692) Avail NTIS HC \$5 50 CSCL 06S

A prototype balance study was conducted on earth prior to
the balance studies conducted in Skylab itself Collected were
daily dietary intake data of 6 minerals and nitrogen and fecal
and urinary outputs on each of three astronauts Essential
statistical issues show what quantities need to be estimated
and establish the scope of inference associated with alternative
variance estimates The procedures for obtaining the final variability
due both to errors of measurement and total error (total =
measurement and biological variability) are exhibited Author

**N76-11693# Advisory Group for Aerospace Research and
Development Paris (France)**

RADIATION HAZARDS

Aug 1975 149 p refs Presented at a Lecture Series in The
Netherlands, 22-23 Sep 1975 Germany, 25-26 Sep 1975
and Norway 29-30 Sep 1975 Sponsored by the Aerospace
Med Panel and the Consultant and Exchange Programme of
AGARD
(AGARD-LS-78) Avail NTIS HC \$6 00

There has been a remarkable development and increase in
the number of processes and devices that utilize or emit
non-ionizing radiation which includes ultra-violet, visible light,
infrared, microwave radiofrequency ultrasound This series
provides a scientifically accurate, authoritative review and critical
analysis of the available information and concepts to give a
basis for informed judgements and judicious application of these
energies for maximal benefit and minimum risk or hazard to
man

**N76-11694 Rochester Univ., NY School of Medicine and
Dentistry**

**PATHOPHYSIOLOGIC ASPECTS OF EXPOSURE TO
MICROWAVE**

Sol M Michaelson In AGARD Radiation Hazards Aug 1975
7 p refs

Body temperature increase during exposure to microwaves
is explored Awareness of microwave exposure is developed by
several mechanisms, including cutaneous thermal sensation or
pain Cataracts were produced in some experimental animals
primarily rabbits when the eyes were directly exposed to rather
high power density of microwaves over periods ranging from
several minutes to hours Microwave effects on the tests was
studied along with chromosome changes hematopoiesis and
cardiovascular effects J A M

N76-11696 Washington Univ Seattle Bioelectromagnetics Research Lab

BIOPHYSICS - ENERGY ABSORPTION AND DISTRIBUTION

Arthur W Guy *In* AGARD Radiation Hazards Aug 1975 14 p refs

The interpretation of the biological effects observed in tissues exposed to EM fields requires a complete quantitative description of the fields within the tissues. These fields are complex functions of the source configuration, shape and size of the exposed subject and the frequency. The average and maximum absorbed power density may vary over many orders of magnitude for the same applied field intensities. Depending on conditions, power absorption may be predominantly at the surface of the subject or may be affecting only superficial tissues in the interior of the subject affecting deep tissues. Author

N76-11697 Air Force Systems Command Brooks AFB Tex Radiation Physics Branch

ELECTROMAGNETIC RADIATION EFFECTS ON THE EYE

John C Mitchell *In* AGARD Radiation Hazards Aug 1975 6 p refs

The purpose is to analyze collectively the EMR research studies on ocular effects and provide an overview of the practical aspects of this problem today. The principal conclusions from this effort are: (1) The acute thermal insult from high intensity EMR fields is cataractogenic if intraocular temperatures reach 45-55°C. (2) The EMR exposure threshold is about 100-150 mW/sq cm applied for about 60-100 minutes. (3) There does not appear to be a cumulative effect from EMR exposures unless each single exposure is sufficient to produce some irreparable degree of injury to the eyes. Author

N76-11698 Rochester Univ NY Dept of Radiation Biology and Biophysics

ENDOCRINE AND CENTRAL NERVOUS SYSTEM EFFECTS OF MICROWAVE EXPOSURE

Sol M Michaelson *In* AGARD Radiation Hazards Aug 1975 8 p refs

Functional alterations in the neuroendocrine system of both animals and humans exposed to microwaves were reported. Findings include changes in the secretions of the pituitary gland, adrenal cortex, thyroid gland and the gonads. In most cases, the endocrine changes attributed to microwave exposure were not adequately documented. Findings of a large number of studies were used to overstate the conclusions or derive assumptions incompatible with the cybernetic model of the function of the neuroendocrine system. Author

N76-11699 Washington Univ Seattle Bioelectromagnetics Research Lab

MICROWAVE INDUCED ACOUSTIC EFFECTS IN MAMMALIAN AUDITORY SYSTEMS

Arthur W Guy and Chung-Kwang Chou *In* AGARD Radiation Hazards Aug 1975 17 p refs

Pulsed microwave fields with incident energy densities of 20 to 40 micro Joule per sq cm per pulse will produce responses in the auditory system of man and animals similar to those produced by auditory stimuli. Recent studies indicate that the responses may be originated from high frequency vibrations induced in the head of the exposed subject by a transient thermal expansion of tissue due to the rapid absorption of the pulsed microwave energy. Author

N76-11700 Royal Marsden Hospital Sutton (England) Physics Div

BIOLOGICAL EFFECTS OF ULTRASOUND

C R Hill *In* AGARD Radiation Hazards Aug 1975 4 p refs

Ultrasound comprises mechanical vibrations occurring in the frequency range above 20 kHz and extending in practice to above 10 Hz, correspondingly there is a very wide range of practical applications each with different possibilities for exposure

of human beings to ultrasonic energy. Three main areas that are necessary to understand the possible hazards from ultrasound use are discussed: (1) the actual physical exposures encountered by humans in various activities; (2) the nature of the biophysical interactions of ultrasound with human tissues; and (3) the evidence for and against significant changes being produced in living systems by the action of ultrasound. Author

N76-11701 Washington Univ Seattle Bioelectromagnetics Research Lab

ENGINEERING CONSIDERATIONS AND MEASUREMENTS

Arthur W Guy *In* AGARD Radiation Hazards Aug 1975 36 p refs

Quantitation of the biological effects in subjects exposed to electromagnetic fields requires that both the fields in the environment and within the exposed tissues be measured. Fields in the environment can be measured by means of standard off-the-shelf field survey meter sensors consisting of small dipoles with diode or thermocouple-type transducers for converting microwaves or RF energy to proportional electrical signals. Fields and associated absorbed power density in the tissues can be measured by means of thermocouples, thermistors, fiber optic liquid crystal sensors and thermography. The quantitation of fields associated with exposure of test subjects can be significantly simplified by a judicious choice of exposure techniques. Author

N76-11702 Air Force Systems Command Brooks AFB Tex School of Aerospace Medicine

ELECTROMAGNETIC INTERFERENCE OF CARDIAC PACEMAKERS

John C Mitchell *In* AGARD Radiation Hazards Aug 1975 10 p refs

The effect of electromagnetic radiation (EMR) on cardiac pacemakers is a unique bioeffects problem. Current test procedures including methods to simulate pacemaker implant conditions and the use of fiber optics instrumentation techniques for cardiac simulation and pacemaker interference evaluation, are presented. Test results and their clinical significance are discussed for different types of EMR emissions including microwave ovens, electrical appliances, gasoline engine ignition, radar and intense electromagnetic pulse generators. Threshold values for pacemaker electromagnetic interference (EMI) range from 10 V/m for the more sensitive devices to greater than 300 V/m for the less susceptible devices. Such EMI threshold values are further modified by the frequency and pulse width of the incident EMR signal. Maximum interference coupling appears to occur at frequencies between 100 and 500 MHz and the EMI threshold is inversely proportional to pulse width over the range from one microsecond to several milliseconds. The ultimate biological effect is dependent on the characteristics of the EMR source, the proximity of the pacemaker user to the source, the attenuation afforded by body shielding and orientation, and the state-of-health of the pacemaker user. The test results presented provide considerable evidence that many manufacturers have recognized EMI as a potential bioeffects problem and have taken the necessary corrective actions to build devices with good electromagnetic compatibility. Author

N76-11705* Pennsylvania Univ Philadelphia Plant Centrifuge Lab

CIRCADIAN RHYTHM OF LEAF MOVEMENT IN CAPSICUM ANNUUM OBSERVED DURING CENTRIFUGATION

D K Chapman, A H Brown and A O Dahl 7 Nov 1975 24 p refs

(Grants NGR-39-010-104, NGR-39-010-149,

NGR-39-030-010)

(NASA-CR-145614, CIRCAD-1) Avail NTIS HC \$3.50 CSCL 06C

Plant circadian rhythms of leaf movement in seedlings of the pepper plant (*Capsicum annuum* L. var Yolo Wonder) were observed at different g-levels by means of a centrifuge. Except for the chronically imposed g-force, all environmental conditions to which the plants were exposed were held constant. The circadian period, rate of change of amplitude of successive

oscillations symmetry of the cycles and phase of the rhythm all were found not to be significantly correlated with the magnitude of the sustained g-force Author

N76-11706 RAND Corp., Santa Monica Calif
FUTURE SPACE EXPLORATION AN EQUAL OPPORTUNITY EMPLOYER?

Glenda G Callanen Aug 1975 10 p refs
 (P-5492) Avail Issuing Activity

Although the traditional psychological impediments are diminishing, they have produced some scientific reasons why the U S has had no female astronauts Women's two major obstacles have been the lack of skills required for astronaut selection and a lack of data on the females tolerances for space flight stresses The latter problem has been partially reduced by the 1973 tests conducted at the Ames Research Center in California Based on the test results of 12 Air Force nurses which indicated that females apparently tolerate space flight stresses as well as males NASA announced that women will not be excluded from the crews of the planned space shuttle flights Author

N76-11708* Transemanatics Inc., Washington, D C
REDUCTION OF THE BACTERIAL CONTAMINATION BY THE USE OF LAMINAR FLOW IN THE CONSTRUCTION OF CARDIAC VALVES

A Juffe E J Perea, J L Castillo-Olivares and D Figuear Washington NASA Nov 1975 9 p refs Transl into ENGLISH from Prensa Med Arg (Buenos Aires) v 62 no 5, May 1975 p 109-111

(Contract NASw-2792)

(NASA-TT-F-16643) Avail NTIS HC \$3 50 CSCL 06M

The effect of laminar flow on reducing microbial contamination during the construction of valves from fascia lata was studied It was found that there was a significant reduction (P less than 0 005) in the bacterial count in the group of valves constructed under conditions of laminar flow as compared with the test group constructed in an adjacent operating room not using conditions of laminar flow Author

N76-11709* Scientific Translation Service Santa Barbara Calif
VISION FROM A MOVING CAR (NO 1)

H OHara Washington NASA Oct 1975 26 p Transl into ENGLISH from Nippon Ganka Gakkei Zasshi (Tokyo) v 54, no 9 28 Sep 1950 p 320-332

(Contract NASw-2791)

(NASA-TT-F-16638) Avail NTIS HC \$4 00 CSCL 05E

The effects of motion on human cognitive abilities were studied by evaluating visual acuity while subjects were in moving trains automobiles, or locomotives Measurements on the distance of recognition while approaching a marker or while moving away from it showed a decreasing positive value as the rate of speed increased G G

N76-11710* Kanner (Leo) Associates, Redwood City Calif
SOME HEMODYNAMIC INDICES AT HIGH ALTITUDE AT REST AND AFTER INTENSE PHYSICAL EXERCISE

V G Mashkovskiy Washington NASA Oct 1975 13 p refs Transl into ENGLISH from Kardiologiya (Moscow) v 15 no 6, Jun 1975 p 61-67

(Contract NASw-2790)

(NASA-TT-F-16639) Avail NTIS HC \$3 50 CSCL 06S

For 5 years, 364 normal males aged 19-25, were studied at the altitude of 3800-4200 m along with local inhabitants of the mountain region Hemodynamic shifts and arterial blood oxygenation were studied with the base metabolism conditions preserved both at rest and after intensive physical exercises The exercises were performed according to the step-test method (cardiological motion test, WHO 1967) The maximum physical workload caused a distinct intensification of the circulatory reactions, especially in those living for considerable periods of time at high altitude Most of these subjects showed no ill effects from the exercise Hence they must have a considerable reserve of functional capacities of their cardiovascular system and be capable of hard muscle work at high altitudes There

was a noticeable difference in test results of persons who had been at high altitude for different time periods Author

N76-11711* Kanner (Leo) Associates Redwood City Calif
AN EVALUATION OF RESULTS OF ERGOMETRIC STUDIES

V P Pomerantsev V L Khomenko A G Ivashchuk and A I Mikheyev Washington NASA Oct 1975 10 p refs Transl into ENGLISH from Kardiologiya (USSR) v 15 no 6 Jun 1975 p 57-61

(Contract NASw-2790)

(NASA-TT-F-16641) Avail NTIS HC \$3 50 CSCL 16P

An evaluation of some standardized and relative indices of ergometry is presented heart rate and oxygen consumption as percentage of individual values indices of chromo-, inotropic, aerobic and coronary reserves The investigation is based on the study of 113 normal individuals 363 hypertonic patients and 100 patients with ischaemic heart disease The use of the relative values of the heart rate and oxygen consumption shows that the role of individual factors (sex age body weight) was negligible The determination of the relative augmentation of these indices as well as of the arterial pressure, permits making the state of functional reserves of the cardiopulmonary system more precise and can be used for the diagnosis and evaluation of therapeutic results Author

N76-11712* McDonnell-Douglas Astronautics Co Huntington Beach Calif Biotechnology and Space Sciences Dept

EVALUATION OF EARLY RECOGNITION OF VIRAL INFECTIONS IN MAN Final Report

A A Kelton and M B Lawton Oct 1975 250 p refs

(Contract NAS9-13740)

(NASA-CR-144559) Avail NTIS HC \$8 00 CSCL 06E

The potential of Lymphocyte Specific Gravity Distribution (LSGD) as a non-specific procedure for early diagnosis of viral disease in astronauts is considered Results of experiments and a literature search show that several virus diseases result in distinctive changes in the specific gravity distribution of peripheral blood lymphocytes as a result of disease process and associated immune response A tentative model is proposed which relates the shape of LSGD to the identity of subpopulations of peripheral lymphocytes in a preclinical viral disease situation G G

N76-11713* Missouri Univ Kansas City
APPLICATION OF CABIN ATMOSPHERE MONITORS TO RAPID SCREENING OF BREATH SAMPLES FOR THE EARLY DETECTION OF DISEASE STATES Final Report, 1 Oct 1974 - 30 Sep 1975

Jimmie L Valentine and Paul J Bryant 30 Sep 1975 26 p refs

(Contract NAS9-14369)

(NASA-CR-144548) Avail NTIS HC \$4 00 CSCL 06B

Analysis of human breath is a noninvasive method to monitor both endogenous and exogenous chemicals found in the body Several technologies were investigated and developed which are applicable to monitoring some organic molecules important in both physiological and pathological states Two methods were developed for enriching the organic molecules exhaled in the breath of humans One device is based on a respiratory face mask fitted with a polyethylene foam wafer while the other device is a cryogenic trap utilizing an organic solvent Using laboratory workers as controls two organic molecules which occurred in the enriched breath of all subjects were tentatively identified as lactic acid and cortisol Both of these substances occurred in breath in sufficient amounts that the conventional method of gas-liquid chromatography was adequate for detection and quantification To detect and quantitate trace amounts of chemicals in breath, another type of technology was developed in which analysis was conducted using high pressure liquid chromatography and mass spectrometry Author

N76-11714* Lecler (Michel) Inc., Harvey, La
REPORT ON COMPUTATION OF REPETITIVE HYPERBARIC-HYPOBARIC DECOMPRESSION TABLES

Peter O Edel 15 May 1975 34 p refs
(Contract NAS9-14352)

(NASA-CR-144560) Avail NTIS HC \$4.00 CSCL 06S

The tables were constructed specifically for NASA's simulated weightlessness training program, they provide for 8 depth ranges covering depths from 7 to 47 FSW with exposure times of 15 to 360 minutes. These tables were based up on an 8 compartment model using tissue half-time values of 5 to 360 minutes and Workmanline M-values for control of the decompression obligation resulting from hyperbaric exposures. Supersaturation ratios of 1.55 to 2.1 were used for control of ascents to altitude following such repetitive dives. Adequacy of the method and the resultant tables were determined in light of past experience with decompression involving hyperbaric-hypobaric interfaces in human exposures. Using these criteria the method showed conformity with empirically determined values. In areas where a discrepancy existed the tables would err in the direction of safety. Author

N76-11715# Aerospace Medical Research Labs., Wright-Patterson AFB Ohio

A REVIEW OF THE TOXICOLOGY OF HALOGENATED FIRE EXTINGUISHING AGENTS Final Report

E W VonStee Nov 1974 89 p refs

(AF Proj 6302)

(AD-A011538 AMRL-TR-74-143) Avail NTIS CSCL 06/20

Bromotrifluoromethane (Halon 1301), bromochlorodifluoromethane (Halon 1211) and chlorobromomethane (Halon 1011) were evaluated for toxicity and toxic hazards. The most important toxicological effects of these compounds are on the central nervous and cardiovascular systems. The neurological effects are manifested as alterations of perception and a reduction in reaction time and the ability to concentrate on complex intellectual tasks. The cardiovascular effects are manifested as changes in cardiovascular dynamics and the electrical activity of the heart. Clinically important central nervous system effects generally appear at lower levels of exposure than clinically important cardiovascular effects. Behavioral changes and performance decrements during exposure would undoubtedly have some effect on the interaction of the subject with his environment and such consequences of exposure could be life-threatening.

GRA

N76-11716# Texas Univ Austin Bio-Medical Engineering Research Lab

SLEEP-WAKEFULNESS DETERMINATIONS FROM HEART RATE DATA Interim Report, 1 May 1974 - 30 Apr 1975

Mike Lisenby, R C Richardson, and A J Welch 15 Jun 1975 185 p refs

(Contract DAMD17-74-C-4081)

(AD-A012275 TR-173) Avail NTIS CSCL 06/16

In recent years a number of projects related to the automated classification of levels of alertness have been conducted in the Bio-Medical Engineering Program. All of these projects were designed with a common goal in mind: the development of a process by which rapid inexpensive determinations of levels of alertness could be performed accurately using an easily derived physiologic parameter such as beat-by-beat heart rate. By combining procedures and results of these previous studies a conglomerate algorithm can be developed which has all the necessary capabilities. One of the primary goals was achieved: the reduction of cost, volume and complexity in automated classification of levels of alertness. It was felt that improvements can be made which will provide substantial progress toward fulfilling the remainder of the goals.

GRA

N76-11717# Army Aeromedical Research Lab., Fort Rucker, Ala

EFFECTS OF OXYGEN AND REDUCED GLUTATHIONE ON THE OXYGEN CONSUMPTION OF MOUSE LIVER Final Report

Dennis A Baeyens and Mary J Meier May 1975 16 p refs
(AD-A012172, USAARL-75-20) Avail NTIS CSCL 06/19

The effects of hyperbaric oxygen tensions on the oxygen consumption of mouse liver homogenates was investigated.

Hyperbaric oxygen rapidly inhibits the oxidative metabolism of the mammalian liver. Mouse liver homogenate exposed to a PO₂ of 3837.8 mm Hg for 30 minutes showed a 50.6% reduction in oxygen consumption compared to controls exposed to nitrogen at ambient pressure. The effect of reduced glutathione (GSH) as a protective agent against hyperbaric oxygen toxicity was also examined. Liver homogenates pretreated with GSH and exposed to high oxygen tensions demonstrated greater activity than untreated controls. It is concluded that (1) GSH protects important enzymes of oxidative metabolism by keeping them in a reduced and viable state and (2) GSH can stimulate oxygen consumption by increasing succinate formation through a GSH-succinate shunt.

GRA

N76-11718# Human Engineering Labs Aberdeen Proving Ground Md

A SIMULATION OF THE HUMAN SHOULDER Final Technical Memo

Richard R Kramer May 1975 56 p refs

(AD-A012174 HEL-TM-15-75) Avail NTIS CSCL 05/5

A method is presented for estimating the recoil force at the interface between the firer's shoulder and his weapon. The method involves simultaneous second order differential equations whose coefficients have been determined by empirical fits. An example is given which shows how the initial pitch-up and the recoil forces of a rocket launcher can be estimated.

GRA

N76-11719# New Mexico Univ., Albuquerque Dept of Anatomy

STUDIES OF ORIENTATIONAL AND POSTURAL MECHANISMS IN A MODEL NEURAL SYSTEM Final Report, 1 Feb 1973 - 1 Feb 1975

Leo S Demski and Diana H Bauer Feb 1975 53 p refs

(Grant AF-AFOSR-2491-73, AF Proj 9777)

(AD-A012027 AFOSR-75-0829TR) Avail NTIS CSCL 06/16

Utilizing eye movements as a measure of vestibular activity regions of the brain involved in their control and in possible mediation of postural and orientational responses have been studied through electrical stimulation of the brain in anesthetized animals. A mapping of the brain has been accomplished. Experiments performed on chronically implanted animals indicate that stimulation of the brain in areas associated with eye movements in the anesthetized subject in most cases produces a postural change which could be predicted from the eye movements of the manually positioned animal. Therefore the areas of the brain related to movements identified in the earlier studies are probably also involved in more complex postural and orientational responses.

GRA

N76-11720# Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab

ON THE PURPOSE OF LOW-LEVEL VISION

David Marr Dec 1974 31 p refs

(Contract N00014-70-A-0362-0005)

(AD-A012392 AI-M-324) Avail NTIS CSCL 06/4

The article advances the thesis that the purpose of low-level vision is to encode symbolically all of the useful information contained in an intensity array using a vocabulary of very low-level symbols. Subsequent processes should have access only to this symbolic description. The reason is one of computational expediency. It allows the low-level processes to run almost autonomously, and it greatly simplifies the application of criteria to an image whose representation in terms of conditions on the initial intensities, or on simple measurements made from them is very cumbersome.

GRA

N76-11721# Environmental Health Lab McClellan AFB, Calif **HEALTH HAZARD POTENTIAL OF HYPOL (TRADEMARK) POLYURETHANE PREPOLYMERS Final Report**

Marlin L Sweigart and Philip Diamond May 1975 52 p refs
(AD-A011997 EHL-M-75M-9) Avail NTIS CSCL 06/10

This report presents the results of an evaluation of the potential hazards associated with the use of various formulations of foamable hydrophilic polyisocyanates containing one to two weight percent free toluene diisocyanate (TDI) in Air Force Pacer Foam.

operations TDI concentrations and generation rates are presented as well as recommended controls for the use of these prepolymers in foaming operations Permissible dosage and analysis procedures are also discussed GRA

N76-11722* Massachusetts Inst of Tech Cambridge Man-Vehicle Lab

THE ANALYSIS OF THE PILOT'S COGNITIVE AND DECISION PROCESSES Progress Report, 1 Mar - 31 Aug 1975

R E Curry 31 Aug 1975 85 p refs

(Grant NGR-22-009-733)

(NASA-CR-145739) Avail NTIS HC \$5 00 CSCL 05E

Articles are presented on pilot performance in zero-visibility precision approach, failure detection by pilots during automatic landing experiments in pilot decision-making during simulated low visibility approaches a multinomial maximum likelihood program and a random search algorithm for laboratory computers Other topics discussed include detection of system failures in multi-axis tasks and changes in pilot workload during an instrument landing MJS

N76-11723 Army Personnel Research Committee London (England)

THE EFFECT OF A FILTERED CONTROL ON OPERATORS' HAND TREMOR

M Waygood Apr 1974 15 p refs

(APRC-72/cs-7 BR47799) Avail NTIS HC \$3 50

The twelve operators compensated for errors they produced while holding a spot central in a stationary square target Filtering their control movements obtained from strain gauges increased their proficiency compared with a condition in which the control movements were presented at a gain of 189 It is argued that filtering of the operator's control demands may improve his performance when the target is stationary Author (ESA)

N76-11724 Michigan Univ Ann Arbor Human Performance Center

THE EFFECT OF TIME SHARING ON THE PERFORMANCE OF INFORMATION PROCESSING TASKS A FEEDBACK CONTROL ANALYSIS

Christopher Dow Wickens Aug 1974 167 p refs

(Contract F44620-72-C-0019)

(AD-A012023 TR-51 Rept-010588-21-T

AFOSR-75-0906TR) Avail NTIS CSCL 05/10

The limited nature of man's attentional processes is a fundamental principle that underlies any general theory of human performance or human information processing However psychologists have been unable to settle upon a precise definition of the term attention One approach that can be taken toward clarifying ambiguity in the meaning of attention is to study man's behavior in a time sharing paradigm, one in which attention must be shared between the performance of two or more tasks The purpose of the current research was to examine these time-sharing effects in a manual tracking paradigm employing the fine-grained analysis provided by the techniques of feedback control theory GRA

N76-11725 Aeronautical Research Labs, Melbourne (Australia) **DYNAMIC TESTS OF A YIELDING SEAT AND SEAT BELT SYSTEM FOR CRASH PROTECTION**

S R Sarraillhe and N D Hearn Mar 1975 43 p refs

(ARL/Struc-358) Avail NTIS HC \$4 00

Dynamic tests were carried out on standard and yielding seat belt restraint systems to evaluate and compare their performance The seat belts were of the lap sash type with the lap straps attached to the seat The yielding system had energy absorbers in the sash strap and seat anchorage Test sled accelerations ranged from 120 to 240 m/sec/sec with the standard belt and to 300 m/sec/sec with the yielding system Peak restraint loads increased progressively with increase in acceleration in the case of the standard system but the yielding system allowed an increase in the acceleration of approximately 85% without an increase in peak load At a sled acceleration of 240 m/sec/sec the load in the yielding system was 70% of

that in the standard system The work is applicable to restraints in both aircraft and motor vehicles Author

N76-11726* Fairchild Republic Co, Farmingdale, NY **SPACE SHUTTLE GALLEY WATER SYSTEM TEST PROGRAM Final Report**

Oct 1975 26 p

(Contract NAS9-14719)

(NASA-CR-144531, RD008V3201) Avail NTIS HC \$4 00 CSCL 06K

A water system for food rehydration was tested to determine the requirements for a space shuttle galley flight system A new food package concept had been previously developed in which water was introduced into the sealed package by means of a needle and septum The needle configuration was developed and the flow characteristics measured The interface between the food package and the water system oven and food tray was determined Author

N76-11727* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

SKYLAB EXPERIMENT M487 HABITABILITY/CREW QUARTERS

Caldwell C Johnson Oct 1975 61 p refs

(NASA-TM-X-58163 JSC-09677) Avail NTIS HC \$4 50 CSCL 06K

Results of Skylab experiment M487 (habitability/crew quarters), which was designed to evaluate the habitability features of Skylab, were presented General observations and conclusions drawn from the data obtained are presented in detail The objectives of the experiment the manner in which data was acquired, and the instruments used to support the experiments are described Illustrations and photographs of the living and work areas of Skylab and some of the habitability features are provided Samples of the subjective evaluation questionnaires used by the crewmen are included Habitability-related documents crewmen biographies, functional characteristics and photographs of the instruments used and details of Skylab compartment sizes and color schemes are included as appendixes Author

N76-11728 Dow Chemical Co Golden Colo Radiation Monitoring Group

QUANTITATIVE RESPIRATOR MAN-TESTING AND ANTHROPOMETRIC SURVEY

J D Leigh 22 May 1975 12 p ref

(Contract AT(29-1)-1106)

(RFP-2358, TID-4500-R62) Avail NTIS HC \$4 00

A recent anthropometric survey and test procedures are reported for the respiratory protection program to safeguard the health of personnel Respiratory protection procedures involve the selection of face masks worn by plant personnel The fitting handling, and use of face masks through explicit instructions can assure optimum protection Comparisons are made with the test panel selection parameters established by the Los Alamos Scientific Laboratory in Los Alamos, New Mexico and recommendations by Webb Associates of Yellow Springs, Ohio Author (NSA)

N76-11729 Royal Aircraft Establishment, Farnborough (England)

THE EFFECT OF A TRACKING TASK ON SPEECH INTELLIGIBILITY IN NOISE Ph D Thesis - Southampton Univ., Engl., 1974

Mary E Johnston Mar 1975 48 p refs

(RAE-TR-75014, BR64915) Avail NTIS HC \$4 00

An investigation is described which was carried out to study the effect of noise and performance of a tracking task on speech intelligibility The results indicate that for some subjects there is a significant detrimental effect of tracking on speech intelligibility, and that this effect may be offset by improving the signal/noise ratios of communication These results suggest that it is inaccurate to use data based on classical single-stress intelligibility tests in the design and assessment of communication systems to be used in multi-activity real life situations Author (ESA)

N76-11730# General Electric Co Lynn Mass Direct Energy Conversion Programs

RESEARCH ON REVERSE OSMOSIS MEMBRANES FOR PURIFICATION OF WASH WATER AT STERILIZATION TEMPERATURE (165 DEGREES F) Research Report, Mar 1971 - Sep 1974

M E Nolan and A B LaConti Jun 1975 58 p refs

(Contract DI-14-30-2752)

(PB-242521/3 W75-08575 Int-OSW-RDPR-75-1003 RR-2)

Avail NTIS HC \$4 50 CSCL 07A

The goal was to develop viable reverse osmosis (RO) modules and systems of tubular design of approximately 80 gpd capacity to recover wash water at sterilization temperatures. An 80 gpd RO system was fabricated for recovering wash water at sterilization temperatures. The performance characteristics of ancillary components including particulate filters, gauges, meters, RO pump, accumulator, carbon polishing column were verified by integrating the components into a suitable subsystem containing the RO module and life testing with wash water. The twenty tube module was used to define the total system and identify/correct some of the life limiting problems and was tested under simulated mission conditions with wash water. GRA

N76-11731# Navy Clothing and Textile Research Unit, Natick Mass

VISOR SYSTEM MATERIALS FOR ALUMINIZED FIREMEN'S HOODS REPORT NO 1 PROBLEM IDENTIFICATION

Norman F Audet May 1975 28 p refs

(AD-A011420, TR-111) Avail NTIS CSCL 06/7

The study determined the durability of the gold-coated facepiece component of the crash-crew firefighters' visor system because field observations indicated that the gold coating wore off readily. The study examined methods employed by fire station personnel in caring for the facepiece and in replacing it and the effect of various contaminants and abrasive materials on the quality of the gold coating and its subsequent heat resistance. GRA

N76-11732# Synsis, Inc Los Angeles, Calif

PROTOTYPE COLD WEATHER HEADWEAR Final Report, Oct 1973 - Oct 1974

David Mangelsdorf Marvin Goldberg, and Heidi Santschi Oct 1974 73 p refs

(Contract DAAK03-74-C-0030 DA Proj 1T7-62713-DJ-40)

(AD-A012314 USA-NLABS-TR-75-42-CE, CE/MEL-137) Avail NTIS CSCL 06/17

Prototypes of an improved cold weather headgear ensemble have been developed which should provide protection from cold, wind, blowing snow, and frostbite in environments to -65F and 35 miles per hour wind velocities. The ensemble provides physical compatibility with military clothing and equipment and does not occlude the field of vision. The design covers the face, head and neck and is provided with features that permit achieving varying degrees of protection in response to varying severity of the environmental threat. The ensemble and its elements are composed largely of a helanca/urethane foam/cotton jersey laminate which provides excellent insulating properties, sound transparency, and permeability. GRA

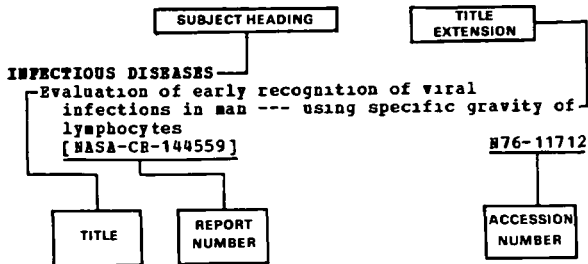
N76-11924 Joint Publications Research Service, Arlington, Va
BIOMEDICAL RESEARCH

In its Space Res Conducted in the USSR in 1974 COSPAR Rept, 18th Plenary Session (JPRS-65778) 29 Sep 1975 p 81-93 Transl into ENGLISH from the book Kosmicheskie Issledovaniya, Vypolnennyye v SSSR v 1974 Godu Doklad KOSPAR Vosemnadtsatyy Plenum Moscow, Izdatelstvo Nauka 23 Apr 1975 13 p

Physiological reactions experienced by cosmonauts aboard the Salyut 3 space station and the Soyuz 14, 15 and 16 flights are discussed. Biological experiments conducted aboard Soyuz 16 and various Cosmos flights are also described. D M L

SUBJECT INDEX

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content a title extension is added separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable a report number is also included as an aid in identifying the document.

A

ABIOTENESIS

The dependence of the content and concentration of products of enzymatic oxidation on the size of coacervate droplets --- abiogenesis

A76-10809

ACCELERATION STRESSES (PHYSIOLOGY)

Heart pathology associated with exposure to high sustained +Gz

A76-11706

Ways of further perfecting methods of vestibular selection --- cumulative effects of Coriolis and centripetal accelerations

A76-11918

Change in absorption and secretion functions of small intestine under the influence of rocking

A76-12303

X-ray investigation in aviation and space medicine [NASA-TT-F-804]

N76-10705

ACCIDENT INVESTIGATION

Ophthalmological examination of laser workers and investigation of laser accidents

N76-11315

ACOUSTIC PROPERTIES

Low-frequency acoustic characteristics of biological tissues

A76-12561

ACTIVATION (BIOLOGY)

Effect of a sequence of activating pulses on the contractile properties of muscle

A76-12556

ACTIVITY (BIOLOGY)

Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range [AD-A011482]

N76-10715

ADAPTIVE CONTROL

Detection of a change in plant dynamics in a man-machine system

A76-11064

ADRENAL METABOLISM

Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress

A76-11138

Biochemical aspects of acclimatization of man to high altitude stress

A76-12475

ADRENERGICS

Electrophysiology and pharmacology of cardiac arrhythmias. IX - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage. Part B

A76-11450

AEROSPACE MEDICINE

Coronary artery disease and preventive cardiology in aviation medicine

A76-11720

Some particulars on the training of aviation physicians

A76-11917

Hemodynamic indicators in air personnel of varying ages

A76-11920

X-ray investigation in aviation and space medicine [NASA-TT-F-804]

N76-10705

Biomedical research

N76-11924

AGE FACTOR

Effects of age on responses to isometric exercise - Isometric handgrip in noninvasive screening for cardiovascular disease

A76-11449

Coronary artery disease and preventive cardiology in aviation medicine

A76-11720

Hemodynamic indicators in air personnel of varying ages

A76-11920

Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls

A76-12562

Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject

A76-12563

Morphological and functional aspects of studying some mechanical properties of the human aorta

A76-12564

AIRCRAFT ACCIDENT INVESTIGATION

Medical and psychiatric aspects of accident investigation --- aviation pathology

A76-11707

Analysis of human factors in aircraft accidents

A76-11709

Cervicocranium and the aviator's protective helmet --- hangman-noose-type fractures

A76-11710

Error and artefact in post mortem toxicological analysis --- aviation autopsy material contamination

A76-11715

Impaired pilot performance - Drugs or alcohol --- aircraft accident medical investigation

A76-11716

Application of radioimmunoassay techniques in support of toxicologic investigations of aircraft accidents

A76-11719

AIRCRAFT ACCIDENTS

Alcohol and other drugs in aircraft accidents

A76-11713

Alcohol associated with fatal light aircraft accidents, United Kingdom - 1964-1973

A76-11714

Fractures of the spine in helicopter accidents (examination of 25 cases)

N76-10703

AIRCRAFT INSTRUMENTS

SUBJECT INDEX

AIRCRAFT INSTRUMENTS

Human force capabilities for operating aircraft controls at 1, 3, and 5 GZ

[AD-A011545] N76-10739

AIRCRAFT MANEUVERS

Crew rest and nap-of-the-earth flying --- low altitude helicopter flight

A76-11712

Training transfer of a formation flight trainer --- to aircraft formation flying

A76-12165

AIRCRAFT PILOTS

Aviation cardiology in Canada

A76-11468

Operational aspects of pilot incapacitation in a multicrew airliner

A76-11469

Identification of ischemic heart disease --- pilot fitness qualification

A76-11471

Recommendations for subjects with ischemic heart disease --- pilot standards

A76-11472

Hypertension --- pilot fitness

A76-11473

Valvular heart disease --- pilot qualification

A76-11474

AIRSPED

Helmets and head protection in CP ejections 1967-1973 --- helmet loss versus air speed and Q force

A76-11711

ALTITUDE ACCLIMATIZATION

DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions

A76-10808

The condition of the vascular net and the hemoencephalic barrier in the brain cortex of rats in the course of training for hypoxia

A76-12216

Variations in psychomotor efficiency during prolonged stay at high altitude

A76-12244

Biochemical aspects of acclimatization of man to high altitude stress

A76-12475

ALTITUDE SIMULATION

Body composition of mice following exposure to 4300 and 6100 meters

A76-11704

Effect of altitude exposure on platelets

A76-12098

ALTITUDE TESTS

Effects of hypoxia on peripheral visual response to dim stimuli

A76-12525

AMINO ACIDS

Localization of 3H-gamma-aminobutyric acid in the cochlea. Light and electron microscopic autoradiography

[NASA-TT-F-16661] N76-11687

ANALOG TO DIGITAL CONVERTERS

The capability of fluoroscopic systems to determine differential Roentgen-ray absorption

A76-11475

ANEMIAS

Effects of monomethylhydrazine on red blood cell metabolism

[AD-A011548] N76-10717

ANESTHETICS

On the role of the hypothalamus in the mechanism of positional nystagmus

A76-12213

ANGULAR ACCELERATION

Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation

A76-10720

Circadian rhythm of leaf movement in Capsicum annuum observed during centrifugation

[NASA-CR-145614] N76-11705

ANIMALS

Molecular memory?

[NASA-TT-F-16654] N76-11690

ANISOTROPIC MEDIA

The anisotropy of compact bone material subject to impact loads

A76-12559

ANTHROPOMETRY

Quantitative respirator man-testing and anthropometric survey

[BPP-2358] N76-11728

ANTIHISTAMINICS

Alcohol and other drugs in aircraft accidents

A76-11713

AORTA

Morphological and functional aspects of studying some mechanical properties of the human aorta

A76-12564

ARM (ANATOMY)

The effects of personal protective equipment upon the arm reach capability of USAF pilots

[AD-A011580] N76-10738

ARRHYTHMIA

Electrophysiology and pharmacology of cardiac arrhythmias. IX - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage. Part B

A76-11450

ARTERIES

Interaction between pressor and depressor mechanisms in the self-regulation of arterial pressure

A76-12217

ARTERIOSCLEROSIS

Pathological-anatomical studies involving vascular stenoses

A76-11874

Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls

A76-12562

ARTIFICIAL HEART VALVES

Electrical modeling of the blood circulation system

A76-12565

Reduction of the bacterial contamination by the use of laminar flow in the construction of cardiac valves

[NASA-TT-F-16643] N76-11708

ASTRONAUT PERFORMANCE

Human aspects of observation outside the space cabin --- in-flight astronaut visual operative capacity

A76-12481

ASTRONAUTS

Skylab experiment M487 habitability/crew quarters

[NASA-TM-X-58163] N76-11727

ATHLETES

Change in the functional state of the central nervous system and the motor apparatus of athletes under different conditions of activity and rest

A76-12304

ATTENTION

Effects of shifts in the rate of repetitive stimulation on sustained attention

A76-12445

The effect of time sharing on the performance of information processing tasks: A feedback control analysis

[AD-A012023] N76-11724

ATTITUDE CONTROL

The transition of experienced pilots to a frequency-separated aircraft attitude display: A flight experiment

[AD-A001808] N76-10730

AUDIOMETRY

Aviation audiometric lists

A76-11919

AUDITORY PERCEPTION

Aviation audiometric lists

A76-11919

Apparatus for the combined study of the functions of the auditory and visual analyzers

A76-11921

Intermodal transfer in temporal discrimination --- of visual and acoustic stimuli duration

A76-12447

AUDITORY STIMULI

Backward recognition masking --- human psychoacoustics

A76-12337

Ernst Mach on the vestibular organ 100 years ago

A76-12430

AUTONOMIC NERVOUS SYSTEM

Interaction between pressor and depressor mechanisms in the self-regulation of arterial pressure
A76-12217

AUTOPSIES

Error and artefact in post mortem toxicological analysis --- aviation autopsy material contamination
A76-11715

Coronary artery disease and preventive cardiology in aviation medicine
A76-11720

AUTORADIOGRAPHY

Localization of 3H-gamma-aminobutyric acid in the cochlea. Light and electron microscopic autoradiography
[NASA-TT-F-16661]
N76-11687

AXONS

Molecular memory?
[NASA-TT-F-16654]
N76-11690

B**BACKGROUND NOISE**

The effect of a tracking task on speech intelligibility in noise
[RAF-TR-75014]
N76-11729

BACTERIA

Reduction of the bacterial contamination by the use of laminar flow in the construction of cardiac valves
[NASA-TT-F-16643]
N76-11708

BENDING MOMENTS

Determination of the elastic and damping properties of the human femoral bone during bending
A76-12558

BIBLIOGRAPHIES

A bibliography of published information on combustion toxicology
A76-10825

BIOASSAY

Application of radioimmunoassay techniques in support of toxicologic investigations of aircraft accidents
A76-11719

Plankton analysis training manual
[PB-242008/1]
N76-10700

BIOASTRONAUTICS

Radiation safety in space flights: Radiobiological aspects --- Russian book
A76-10303

Biomedical research
N76-11924

BIOCHEMISTRY

Starvation and refeeding of carp (*Cyprinus Carpio* L)
[NASA-TT-F-16649]
N76-10696

BIOCONTROL SYSTEMS

Prostaglandin control of renal circulation in the unanesthetized dog and baboon
A76-10098

Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal
A76-10480

Frequency analyzer for EEG signals
A76-11200

BIODYNAMICS

All-Union Conference on Engineering and Medical Biomechanics, 1st, Riga, Latvian SSR, October 1975, Reports
A76-12551

Mathematical description of the properties of muscle tissue
A76-12552

Model of vascular tonus --- blood vessel mechanics
A76-12553

Governing law of statistical biomechanics
A76-12554

The deformation properties of contractile polymer structures Artificial muscles
A76-12555

Effect of a sequence of activating pulses on the contractile properties of muscle
A76-12556

Study of the propagation of vibrations along the human hip bone
A76-12560

Low-frequency acoustic characteristics of biological tissues
A76-12561

Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls
A76-12562

BIOELECTRIC POTENTIAL

Computer-aided analysis of the probability characteristics of the brain biopotentials in healthy man
A76-11376

Changes in the oxygen tension and bioelectrical activity of the animal brain in acute hypoxia
A76-12211

BIOENGINEERING

All-Union Conference on Engineering and Medical Biomechanics, 1st, Riga, Latvian SSR, October 1975, Reports
A76-12551

Theoretical study of some features of the dynamics of the behavior of skeletal muscle as a one-dimensional viscoelastic medium
A76-12557

Determination of the elastic and damping properties of the human femoral bone during bending
A76-12558

The anisotropy of compact bone material subject to impact loads
A76-12559

Low-frequency acoustic characteristics of biological tissues
A76-12561

Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject
A76-12563

Morphological and functional aspects of studying some mechanical properties of the human aorta
A76-12564

BIOINSTRUMENTATION

Frequency analyzer for EEG signals
A76-11200

Apparatus for the combined study of the functions of the auditory and visual analyzers
A76-11921

Measurement of regional myocardial blood flow in man Description and critique of the method using xenon-133 and a scintillation camera
A76-12163

Multichannel rheograph with linear conversion characteristic and demodulation of pulsed blood filling at minimum probe current
A76-12305

BIOLOGICAL EFFECTS

Experimental models for the evaluation of microwave biological effects
A76-11844

Pathophysiological aspects of exposure to microwave
N76-11694

Biophysics - energy absorption and distribution
N76-11696

Biological effects of ultrasound --- on human beings
N76-11700

Engineering considerations and measurements --- electromagnetic field measurement in environment and tissues after radiation exposure
N76-11701

BIOMEDICAL DATA

Biomedical cost of low-level flight in a hot environment
A76-11703

Cardiomyopathy - The frequently forgotten mimic: Clinical and open-chest myocardial biopsy studies
A76-11705

Medical and psychiatric aspects of accident investigation --- aviation pathology
A76-11707

BIOMETRICS

Governing law of statistical biomechanics
A76-12554

BIONICS

Electrical modeling of the blood circulation system
A76-12565

BLOOD CIRCULATION

SUBJECT INDEX

BLOOD CIRCULATION

- Prostaglandin control of renal circulation in the unanesthetized dog and baboon A76-10098
- Electrical modeling of the blood circulation system A76-12565

BLOOD FLOW

- Pathological-anatomical studies involving vascular stenoses A76-11874
- Measurement of regional myocardial blood flow in man Description and critique of the method using xenon-133 and a scintillation camera A76-12163
- Multichannel rheograph with linear conversion characteristic and demodulation of pulsed blood filling at minimum probe current A76-12305

BLOOD PLASMA

- Analysis of gases and pH of blood at altitude --- inflight equipment calibration techniques A76-11718

BLOOD PRESSURE

- Interaction between pressor and depressor mechanisms in the self-regulation of arterial pressure A76-12217
- Inflight patient monitoring/blood pressure measurement device [AD-A011608] N76-10713

BLOOD VESSELS

- The condition of the vascular net and the hemoenkephalic barrier in the brain cortex of rats in the course of training for hypoxia A76-12216
- Changes in peripheral vessels tone during acute hypoxia A76-12301
- Model of vascular tonus --- blood vessel mechanics A76-12553
- Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject A76-12563

BODY COMPOSITION (BIOLOGY)

- Body composition of mice following exposure to 4300 and 6100 meters A76-11704

BODY TEMPERATURE

- Heat stress in indigenous cattle --- solar radiation effects on east African zebu cattle (Bos indicus) N76-11647

BODY VOLUME (BIOLOGY)

- Analysis of changes in leg volume parameters, and orthostatic tolerance in response to lower body negative pressure during 59 days exposure to zero gravity Skylab 3 [NASA-CR-144515] N76-10707

BODY WEIGHT

- Body composition of mice following exposure to 4300 and 6100 meters A76-11704

BONE MARROW

- DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions A76-10808

BONES

- The anisotropy of compact bone material subject to impact loads A76-12559

BRAIN

- Computer-aided analysis of the probability characteristics of the brain biopotentials in healthy man A76-11376
- Changes in the oxygen tension and bioelectrical activity of the animal brain in acute hypoxia A76-12211
- Microelectrode study of the distribution of oxygen tension in the brain A76-12212
- Modulation of evoked responses during behavioral motor inhibition in the cat [AD-A011457] N76-10727
- Chlorpromazine, piracetam, and the metabolism of brain phospholipids in the rat [NASA-TT-F-16652] N76-11688

BRAIN CIRCULATION

- Hemodynamic indicators in air personnel of varying ages A76-11920
- Change in brain blood circulation during mental activity A76-12302

BREATHING

- Application of cabin atmosphere monitors to rapid screening of breath samples for the early detection of disease states [NASA-CR-144548] N76-11713

BURNS (INJURIES)

- Comments on fire toxicity A76-10823

C

CABIN ATMOSPHERES

- Application of cabin atmosphere monitors to rapid screening of breath samples for the early detection of disease states [NASA-CR-144548] N76-11713

CALIBRATING

- Analysis of gases and pH of blood at altitude --- inflight equipment calibration techniques A76-11718

CANCER

- Influence of Zsub 1210 cell growth of cells sterilized by ionizing radiations [NASA-TT-F-16538] N76-11689

CARBOHYDRATE METABOLISM

- Biochemical aspects of acclimatization of man to high altitude stress A76-12475

CARBON MONOXIDE POISONING

- Comments on fire toxicity A76-10823
- What is the mechanism of carbon monoxide toxicity A76-11717

CARBOXYHEMOGLOBIN

- What is the mechanism of carbon monoxide toxicity A76-11717

CARDIAC VENTRICLES

- Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart A76-12162

CARDIOLOGY

- Electrophysiology and pharmacology of cardiac arrhythmias. IX - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage. Part B A76-11450
- Aviation cardiology in Canada A76-11468

- On experts and expertise - The effect of variability in observer performance --- in coronary pathology analysis A76-11470

- Cardiomyopathy - The frequently forgotten mimic: Clinical and open-chest myocardial biopsy studies A76-11705

- Coronary artery disease and preventive cardiology in aviation medicine A76-11720

CARDIOTACHOMETERS

- Electromagnetic interference of cardiac pacemakers N76-11702

CARDIOVASCULAR SYSTEM

- Effects of age on responses to isometric exercise - Isometric handgrip in noninvasive screening for cardiovascular disease A76-11449

- Changes in peripheral vessels tone during acute hypoxia A76-12301
- Electrical modeling of the blood circulation system A76-12565

CATTLE

- Heat stress in indigenous cattle --- solar radiation effects on east African zebu cattle (Bos indicus) N76-11647

CELLS (BIOLOGY)

- The processing of a colored signal by various types of ganglionic cells in the frog retina A76-12215

- Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range
[AD-A011484] N76-10714
- Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range
[AD-A011482] N76-10715
- Influence of 2sub 1210 cell growth of cells sterilized by ionizing radiations
[NASA-TT-F-16538] N76-11689
- CENTRAL NERVOUS SYSTEM**
- Change in the functional state of the central nervous system and the motor apparatus of athletes under different conditions of activity and rest
A76-12304
- Endocrine and central nervous system effects of microwave exposure
N76-11698
- CENTRIFUGING STRESS**
- Rotatory and vertical components of the eye nystagmus induced by rotation in a horizontal plane
A76-12214
- CEREBRAL CORTEX**
- The condition of the vascular net and the hemoecephalic barrier in the brain cortex of rats in the course of training for hypoxia
A76-12216
- CESIUM ISOTOPES**
- Cs-131 myocardial scintigraphy - Application to assessment of anterior myocardial infarction
A76-10650
- CHEMICAL ANALYSIS**
- Application of cabin atmosphere monitors to rapid screening of breath samples for the early detection of disease states
[NASA-CR-144548] N76-11713
- CHEMICAL STERILIZATION**
- Research on reverse osmosis membranes for purification of wash water at sterilization temperature (165 degrees F)
[PB-242521/3] N76-11730
- CHRONIC CONDITIONS**
- Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress
A76-11138
- CIRCADIAN RHYTHMS**
- Circadian rhythm of leaf movement in Capsicum annum observed during centrifugation
[NASA-CR-145614] N76-11705
- CIRCULATORY SYSTEM**
- Electrical modeling of the blood circulation system
A76-12565
- CLINICAL MEDICINE**
- An evaluation of results of ergometric studies
[NASA-TT-F-16641] N76-11711
- COCHLEA**
- Localization of 3H-gamma-aminobutyric acid in the cochlea. Light and electron microscopic autoradiography
[NASA-TT-F-16661] N76-11687
- CODING**
- On the purpose of low-level vision
[AD-A012392] N76-11720
- COHERENT ELECTROMAGNETIC RADIATION**
- Ocular effects of laser radiation: Cornea and anterior chamber
N76-11310
- COLD WEATHER**
- Prototype cold weather headwear
[AD-A012314] N76-11732
- COLOR VISION**
- The processing of a colored signal by various types of ganglionic cells in the frog retina
A76-12215
- Report of the working party on standardization of the international research group on colour vision deficiencies
[IZP-1975-7] N76-10708
- SEEKVAL project 1A1. Effects of color and brightness contrast on target acquisition
[AD-A011547] N76-10724
- Effects of colored lenses on visual performance
[AD-A011572] N76-10728
- COMBUSTION PRODUCTS**
- Toxicity of decomposition products
A76-10824
- A bibliography of published information on combustion toxicology
A76-10825
- COMMAND AND CONTROL**
- The effects of extended missions on the performance of airborne command and control teams
[AD-A011549] N76-10729
- COMPENSATORY TRACKING**
- Detection of a change in plant dynamics in a man-machine system
A76-11064
- The effect of a tracking task on speech intelligibility in noise
[RAE-TB-75014] N76-11729
- COMPUTER PROGRAMS**
- Advanced crew procedures development techniques: Procedures and performance program training plan
[NASA-CR-144526] N76-10721
- Advanced crew procedures development techniques: Procedures and performance program description
[NASA-CR-144517] N76-10734
- COMPUTER TECHNIQUES**
- Computer-aided analysis of the probability characteristics of the brain biopotentials in healthy man
A76-11376
- CONDITIONING (LEARNING)**
- Evaluation of the energy expended in a learning situation (conditioning based on food reinforcement) by goldfish (Carassius Auratus L.)
[NASA-TT-F-16650] N76-11685
- CONDUCTIVE HEAT TRANSFER**
- Computation of the electromagnetic fields and induced temperatures within a model of the microwave-irradiated human eye
A76-10997
- The application of conductive cooling to human operators
A76-12164
- CONFERENCES**
- All-Union Conference on Engineering and Medical Biomechanics, 1st, Riga, Latvian SSR, October 1975, Reports
A76-12551
- CONTROL STICKS**
- An investigation of single-axis manual control processes and comparative evaluation of human operator models
[PB-21] N76-10736
- COOLING**
- The application of conductive cooling to human operators
A76-12164
- CORIOLIS EFFECT**
- Ways of further perfecting methods of vestibular selection --- cumulative effects of Coriolis and centripetal accelerations
A76-11918
- CORNEA**
- Ocular effects of laser radiation: Cornea and anterior chamber
N76-11310
- CORONARY ARTERY DISEASE**
- Identification of ischemic heart disease --- pilot fitness qualification
A76-11471
- Recommendations for subjects with ischemic heart disease --- pilot standards
A76-11472
- Coronary artery disease and preventive cardiology in aviation medicine
A76-11720
- CRASH INJURIES**
- Cervicocranium and the aviator's protective helmet --- hangman-noose-type fractures
A76-11710
- Fractures of the spine in helicopter accidents (examination of 25 cases)
[RAE-LIB-TRANS-1848] N76-10703
- CRASHERS**
- Dynamic tests of a yielding seat and seat belt system for crash protection
[ARL/STRUC-358] N76-11725
- CREWS**
- Skylab experiment M487 habitability/crew quarters
[NASA-TM-X-58163] N76-11727

D

DATA SYSTEMS

Advanced crew procedures development techniques:
Procedures and performance program training plan
[NASA-CR-144526] N76-10721

Advanced crew procedures development techniques:
Procedures and performance program description
[NASA-CR-144517] N76-10734

DECISION MAKING

The analysis of the pilot's cognitive and decision
processes
[NASA-CR-145739] N76-11722

DECOMPOSITION

Toxicity of decomposition products
A76-10824

DECOMPRESSION SICKNESS

The pathophysiology of decompression sickness: An
overview with emphasis on plasma and lipid changes
[AD-A011153] N76-10711

DECONTAMINATION

Reduction of the bacterial contamination by the
use of laminar flow in the construction of
cardiac valves
[NASA-TT-F-16643] N76-11708

DEOXYRIBONUCLEIC ACID

DNA synthesis in the lymphoid organs of rats
during adaptation to high-altitude conditions
A76-10808

DIAGNOSIS

Cs-131 myocardial scintigraphy - Application to
assessment of anterior myocardial infarction
A76-10650

Aviation cardiology in Canada
A76-11468

On experts and expertise - The effect of
variability in observer performance --- in
coronary pathology analysis
A76-11470

Evaluation of early recognition of viral
infections in man --- using specific gravity of
lymphocytes
[NASA-CR-144559] N76-11712

DIGESTING

Change in absorption and secretion functions of
small intestine under the influence of rocking
A76-12303

DIGITAL TRANSDUCERS

The capability of fluoroscopic systems to
determine differential Roentgen-ray absorption
A76-11475

DISPLAY DEVICES

The transition of experienced pilots to a
frequency-separated aircraft attitude display:
A flight experiment
[AD-A001808] N76-10730

DIVING (UNDERWATER)

Human engineering considerations in the evaluation
of diving equipment
[AD-A011680] N76-10709

Proceedings of the Undersea Medical Society
Workshop (8th) on the Strategy for Future Diving
to Depths Greater than 1,000 feet
[AD-A011456] N76-10719

DOSIMETERS

Evaluation of lithium borate as a 7000-R dosimeter
[LA-5927-M5] N76-10699

DROP SIZE

The dependence of the content and concentration of
products of enzymatic oxidation on the size of
coacervate droplets --- abiogenesis
A76-10809

DRUGS

Impaired pilot performance - Drugs or alcohol ---
aircraft accident medical investigation
A76-11716

DYNAMIC CONTROL

Detection of a change in plant dynamics in a
man-machine system
A76-11064

DYNAMIC MODELS

Dynamics of biped walk. II
A76-11451

Theoretical study of some features of the dynamics
of the behavior of skeletal muscle as a
one-dimensional viscoelastic medium
A76-12557

E

EDUCATION

Some particulars on the training of aviation
physicians
A76-11917

EJECTION INJURIES

Helmets and head protection in CF ejections
1967-1973 --- helmet loss versus air speed and Q
force
A76-11711

ELASTIC DEFORMATION

The deformation properties of contractile polymer
structures Artificial muscles
A76-12555

ELASTIC PROPERTIES

Determination of the elastic and damping
properties of the human femoral bone during
bending
A76-12558

Morphological and functional aspects of studying
some mechanical properties of the human aorta
A76-12564

ELASTIC WAVES

Low-frequency acoustic characteristics of
biological tissues
A76-12561

ELECTROENCEPHALOGRAPHY

Frequency analyzer for EEG signals
A76-11200

Computer-aided analysis of the probability
characteristics of the brain biopotentials in
healthy man
A76-11376

ELECTROLYSIS

Electrochemical air revitalization system
optimization investigation
[NASA-CR-144521] N76-10733

ELECTROMAGNETIC FIELDS

Computation of the electromagnetic fields and
induced temperatures within a model of the
microwave-irradiated human eye
A76-10997

Radiation hazards
[AGARD-LS-78] N76-11693

Biophysics - energy absorption and distribution
N76-11696

Engineering considerations and measurements ---
electromagnetic field measurement in environment
and tissues after radiation exposure
N76-11701

ELECTROMAGNETIC INTERFERENCE

Electromagnetic interference of cardiac pacemakers
N76-11702

ELECTROMAGNETIC RADIATION

Electromagnetic radiation effects on the eye
N76-11697

ELECTROMYOGRAPHY

Responses to load disturbances in human shoulder
muscles - The hypothesis that one component is a
pulse test information signal
A76-10480

ELECTROPHYSIOLOGY

Dynamics of the skin-galvanic reflex for different
stages and cycles of nighttime sleep
A76-11377

Electrophysiology and pharmacology of cardiac
arrhythmias. IX - Cardiac electrophysiologic
effects of beta adrenergic receptor stimulation
and blockage. Part B
A76-11450

EMBOLISMS

The pathophysiology of decompression sickness: An
overview with emphasis on plasma and lipid changes
[AD-A011153] N76-10711

EMERGENCIES

Operational aspects of pilot incapacitation in a
multicrew airliner
A76-11469

EMOTIONAL FACTORS

Change in brain blood circulation during mental
activity
A76-12302

Effect of human psychoemotional stress and
physical activity on the age-related changes in
the mechanical properties of arterial walls
A76-12562

ENDOCRINE SYSTEMS

Endocrine and central nervous system effects of
microwave exposure

N76-11698

ENERGY ABSORPTION

Determination of safe exposure levels: Energy
correlates of ocular damage

N76-11312

ENZYME ACTIVITY

The dependence of the content and concentration of
products of enzymatic oxidation on the size of
coacervate droplets --- abiogenesis

A76-10809

Measurements of lysosomal enzyme activities and
laucine incorporation rates in the brains of
young and old rats after applications of piracetam
[NASA-TT-P-16653]

N76-10704

EQUIPMENT SPECIFICATIONS

Human engineering considerations in the evaluation
of diving equipment
[AD-A011680]

N76-10709

ERGOMETERS

An evaluation of results of ergometric studies
[NASA-TT-P-16641]

N76-11711

ERYTHROCYTES

Reaction of erythrocytes and granulocytes in the
peripheral blood of rats to hyperbaric
oxygenation during oxygen deficiency in the
organism

A76-11238

ETHYL ALCOHOL

Alcohol and other drugs in aircraft accidents

A76-11713

Alcohol associated with fatal light aircraft
accidents, United Kingdom - 1964-1973

A76-11714

Impaired pilot performance - Drugs or alcohol ---
aircraft accident medical investigation

A76-11716

Evaluation of two link GAT-1 trainer tasks by
experienced pilots at three alcohol dose levels
[AD-A011607]

N76-10725

EVASIVE ACTIONS

Crew rest and nap-of-the-earth flying --- low
altitude helicopter flight

A76-11712

EXERCISE (PHYSIOLOGY)

Effects of age on responses to isometric exercise
- Isometric handgrip in noninvasive screening
for cardiovascular disease

A76-11449

EXPOSURE

Determination of safe exposure levels: Energy
correlates of ocular damage

N76-11312

EXTRAPOLATION

Perception and extrapolation of velocity and
acceleration

A76-10719

EXTRAVEHICULAR ACTIVITY

EV space suit gloves (passive)
[NASA-CR-144527]

N76-10732

EYE (ANATOMY)

Computation of the electromagnetic fields and
induced temperatures within a model of the
microwave-irradiated human eye

A76-10997

Determination of safe exposure levels: Energy
correlates of ocular damage

N76-11312

Electromagnetic radiation effects on the eye

N76-11697

EYE EXAMINATIONS

Ophthalmological examination of laser workers and
investigation of laser accidents

N76-11315

EYE MOVEMENTS

Rotatory and vertical components of the eye
nystagmus induced by rotation in a horizontal
plane

A76-12214

Studies of orientational and postural mechanisms
in a model neural system
[AD-A012027]

N76-11719

F

FEMALES

Future space exploration: An equal opportunity
employer? --- selection of women for spacecrews
[P-5492]

N76-11706

FEMUR

Determination of the elastic and damping
properties of the human femoral bone during
bending

A76-12558

Study of the propagation of vibrations along the
human hip bone

A76-12560

FIBER OPTICS

Two-point fluorophotometer for the human ocular
fundus

A76-11419

FILTRATION

Water hyacinths for upgrading sewage lagoons to
meet advanced wastewater treatment standards,
part 1
[NASA-TM-X-72729]

N76-10697

FIRE EXTINGUISHERS

A review of the toxicology of halogenated fire
extinguishing agents
[AD-A011538]

N76-11715

FIRE FIGHTING

Comments on fire toxicity

A76-10823

FIRE PREVENTION

Toxicity of decomposition products

A76-10824

FIRES

Visor system materials for aluminized firemen's
hoods. Report no. 1: Problem identification
[AD-A011420]

N76-11731

FISHES

Starvation and refeeding of carp (*Cyprinus Carpio* L.)
[NASA-TT-P-16649]

N76-10696

Evaluation of the energy expended in a learning
situation (conditioning based on food
reinforcement) by goldfish (*Carassius Auratus* L.)
[NASA-TT-P-16650]

N76-11685

Fasting and renourishment of carp (*Cyprinus Carpio*
L.), 3
[NASA-TT-P-16651]

N76-11686

FLIGHT ALTITUDE

Analysis of gases and pH of blood at altitude ---
inflight equipment calibration techniques

A76-11718

FLIGHT CREWS

Operational aspects of pilot incapacitation in a
multicrew airliner

A76-11469

Crew rest and nap-of-the-earth flying --- low
altitude helicopter flight

A76-11712

Ocular hypertension and chronic open-angle
glaucoma in USAF pilots and navigators
[AD-A010588]

N76-10720

FLIGHT FATIGUE

Crew rest and nap-of-the-earth flying --- low
altitude helicopter flight

A76-11712

FLIGHT FITNESS

Aviation cardiology in Canada

A76-11468

Identification of ischemic heart disease --- pilot
fitness qualification

A76-11471

Recommendations for subjects with ischemic heart
disease --- pilot standards

A76-11472

Hypertension --- pilot fitness

A76-11473

Valvular heart disease --- pilot qualification

A76-11474

Aviation audiometric lists

A76-11919

Hemodynamic indicators in air personnel of varying
ages

A76-11920

FLIGHT HAZARDS

Operational aspects of pilot incapacitation in a
multicrew airliner

A76-11469

FLIGHT SAFETY

SUBJECT INDEX

FLIGHT SAFETY

Radiation safety in space flights: Radiobiological aspects --- Russian book

A76-10303

FLIGHT SIMULATORS

Training transfer of a formation flight trainer
--- to aircraft formation flying

A76-12165

FLIGHT STRESS (BIOLOGY)

Biomedical cost of low-level flight in a hot environment

A76-11703

Medical and psychiatric aspects of accident investigation --- aviation pathology

A76-11707

Some particulars on the training of aviation physicians

A76-11917

FLIGHT TRAINING

Training transfer of a formation flight trainer
--- to aircraft formation flying

A76-12165

Practice and incentive effects on learner performance: Aircraft instrument comprehension task
[AD-A011616]

N76-10726

FLOW MEASUREMENT

Measurement of regional myocardial blood flow in man Description and critique of the method using xenon-133 and a scintillation camera

A76-12163

FLOW RESISTANCE

Pathological-anatomical studies involving vascular stenoses

A76-11874

FLUOROSCOPY

The capability of fluoroscopic systems to determine differential Roentgen-ray absorption

A76-11475

FOVEA

Influence of foveal load on the functional visual field

A76-12446

FRACTURES (MATERIALS)

Fractures of the spine in helicopter accidents (examination of 25 cases)
[RAE-LIB-TRANS-1848]

N76-10703

FREQUENCY ANALYZERS

Frequency analyzer for EEG signals

A76-11200

G

GALVANIC SKIN RESPONSE

Dynamics of the skin-galvanic reflex for different stages and cycles of nighttime sleep

A76-11377

GANGLIA

The processing of a colored signal by various types of ganglionic cells in the frog retina

A76-12215

GAS ANALYSIS

Analysis of gases and pH of blood at altitude --- inflight equipment calibration techniques

A76-11718

GAS DETECTORS

Cabin Atmosphere Monitoring System (CAMS), pre-prototype model development continuation
[NASA-CR-144005]

N76-10731

GLAUCOMA

Ocular hypertension and chronic open-angle glaucoma in USAF pilots and navigators
[AD-A010588]

N76-10720

GLOVES

EV space suit gloves (passive)
[NASA-CR-144527]

N76-10732

GOGGLES

Laboratory assessment of the AN/PVS-5 night vision goggle --- for infrared reconnaissance
[AD-A011053]

N76-10740

GRAVITATIONAL EFFECTS

Circadian rhythm of leaf movement in Capsicum annum observed during centrifugation
[NASA-CR-145614]

N76-11705

GROWTH

The performance and capabilities of terrestrial organisms in extreme and unusual gaseous and liquid environments. Performance of fungi in exotic and harsh environments
[NASA-CR-145395]

N76-10698

Influence of Zsub 1210 cell growth of cells sterilized by ionizing radiations
[NASA-TT-F-16538]

N76-11689

H

HABITABILITY

Skylab experiment M487 habitability/crew quarters
[NASA-TN-X-58163]

N76-11727

HAND (ANATOMY)

The effect of a filtered control on operators' hand tremor
[APRC-72/CS-7]

N76-11723

HEAD (ANATOMY)

Absorption characteristics of multilayered sphere models exposed to UHF/microwave radiation --- head tissue dosimetry phantom

A76-10991

Helmets and head protection in CF ejections 1967-1973 --- helmet loss versus air speed and Q force

A76-11711

Prototype cold weather headwear

N76-11732

HEALTH PHYSICS

Absorption characteristics of multilayered sphere models exposed to UHF/microwave radiation --- head tissue dosimetry phantom

A76-10991

Computation of the electromagnetic fields and induced temperatures within a model of the microwave-irradiated human eye

A76-10997

HEARING

Microwave induced acoustic effects in mammalian auditory systems

N76-11699

HEART DISEASES

Effects of age on responses to isometric exercise - Isometric handgrip in noninvasive screening for cardiovascular disease

A76-11449

Electrophysiology and pharmacology of cardiac arrhythmias. IX - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage. Part B

A76-11450

Valvular heart disease --- pilot qualification

A76-11474

Cardiomyopathy - The frequently forgotten mimic: Clinical and open-chest myocardial biopsy studies

A76-11705

Heart pathology associated with exposure to high sustained +Gz

A76-11706

HEART RATE

Changes in the single-breath nitrogen washout curve on exposure to 17,600 ft

A76-12099

Sleep-wakefulness determinations from heart rate data
[AD-A012275]

N76-11716

HEART VALVES

Valvular heart disease --- pilot qualification

A76-11474

HEAT BALANCE

Experimental models for the evaluation of microwave biological effects

A76-11844

HEAT TOLERANCE

Respiratory resistance and the endurance of men working under thermal stress
[AD-A011261]

N76-10712

Heat stress in indigenous cattle --- solar radiation effects on east African zebu cattle (Bos indicus)

N76-11647

HELICOPTERS

Fractures of the spine in helicopter accidents (examination of 25 cases)
[RAE-LIB-TRANS-1848]

N76-10703

SUBJECT INDEX

HUMAN PERFORMANCE

- HELMETS**
Cervicocranium and the aviator's protective helmet
--- bangman-noose-type fractures A76-11710
Helmets and head protection in CF ejections
1967-1973 --- helmet loss versus air speed and Q force A76-11711
Visor system materials for aluminized firemen's hoods. Report no. 1: Problem identification [AD-A011420] N76-11731
- HEMODYNAMIC RESPONSES**
Effects of age on responses to isometric exercise - Isometric handgrip in noninvasive screening for cardiovascular disease A76-11449
Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart A76-12162
Measurement of regional myocardial blood flow in man Description and critique of the method using xenon-133 and a scintillation camera A76-12163
Some hemodynamic indices at high altitude at rest and after intense physical exercise [NASA-TT-F-16639] N76-11710
- HEMODYNAMICS**
Pathological-anatomical studies involving vascular stenoses A76-11874
Hemodynamic indicators in air personnel of varying ages A76-11920
Changes in peripheral vessels tone during acute hypoxia A76-12301
Multichannel rheograph with linear conversion characteristic and demodulation of pulsed blood filling at minimum probe current A76-12305
- HIGH ALTITUDE ENVIRONMENTS**
Effect of altitude exposure on platelets A76-12098
Changes in the single-breath nitrogen washout curve on exposure to 17,600 ft A76-12099
Biochemical aspects of acclimatization of man to high altitude stress A76-12475
Some hemodynamic indices at high altitude at rest and after intense physical exercise [NASA-TT-F-16639] N76-11710
- HIGH ALTITUDE TESTS**
Variations in psychomotor efficiency during prolonged stay at high altitude A76-12244
- HIGH SPEED**
Vision from a moving car (no.1) [NASA-TT-F-16638] N76-11709
- HUMAN BEINGS**
An evaluation of results of ergometric studies [NASA-TT-F-16641] N76-11711
- HUMAN BODY**
Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal A76-10480
Study of the propagation of vibrations along the human hip bone A76-12560
Application of cabin atmosphere monitors to rapid screening of breath samples for the early detection of disease states [NASA-CR-144548] N76-11713
A simulation of the human shoulder --- recoil from rocket launchers [AD-A012174] N76-11718
- HUMAN FACTORS ENGINEERING**
The application of conductive cooling to human operators A76-12164
Human aspects of observation outside the space cabin --- in-flight astronaut visual operative capacity A76-12481
Human engineering considerations in the evaluation of diving equipment [AD-A011680] N76-10709
- The transition of experienced pilots to a frequency-separated aircraft attitude display: A flight experiment [AD-A001808] N76-10730
Designing for muscular strength of various populations [AD-A011537] N76-10737
A simulation of the human shoulder --- recoil from rocket launchers [AD-A012174] N76-11718
The analysis of the pilot's cognitive and decision processes [NASA-CR-145739] N76-11722
- HUMAN PATHOLOGY**
Comments on fire toxicity A76-10823
A bibliography of published information on combustion toxicology A76-10825
Cardiomyopathy - The frequently forgotten mimic: Clinical and open-chest myocardial biopsy studies A76-11705
Error and artefact in post mortem toxicological analysis --- aviation autopsy material contamination A76-11715
Application of radioimmunoassay techniques in support of toxicologic investigations of aircraft accidents A76-11719
Coronary artery disease and preventive cardiology in aviation medicine A76-11720
Pathological-anatomical studies involving vascular stenoses A76-11874
X-ray investigation in aviation and space medicine [NASA-TT-F-804] N76-10705
The pathophysiology of decompression sickness: An overview with emphasis on plasma and lipid changes [AD-A011153] N76-10711
Evaluation of early recognition of viral infections in man --- using specific gravity of lymphocytes [NASA-CR-144559] N76-11712
- HUMAN PERFORMANCE**
Perception and extrapolation of velocity and acceleration A76-10719
Two-point fluorophotometer for the human ocular fundus A76-11419
Biomedical cost of low-level flight in a hot environment A76-11703
Analysis of human factors in aircraft accidents A76-11709
Backward recognition masking --- human psychoacoustics A76-12337
Intermodal transfer in temporal discrimination --- of visual and acoustic stimuli duration A76-12447
Proceedings of the Undersea Medical Society Workshop (8th) on the Strategy for Future Diving to Depths Greater than 1,000 feet [AD-A011456] N76-10719
SERKVAL project IA1: Effects of color and brightness contrast on target acquisition [AD-A011547] N76-10724
Practice and incentive effects on learner performance: Aircraft instrument comprehension task [AD-A011616] N76-10726
Effects of colored lenses on visual performance [AD-A011572] N76-10728
The effects of extended missions on the performance of airborne command and control teams [AD-A011549] N76-10729
Human force capabilities for operating aircraft controls at 1, 3, and 5 GZ [AD-A011545] N76-10739
Laboratory assessment of the AN/PVS-5 night vision goggle --- for infrared reconnaissance [AD-A011053] N76-10740
Vision from a moving car (no.1) [NASA-TT-F-16638] N76-11709

HUMAN REACTIONS

SUBJECT INDEX

The effect of time sharing on the performance of information processing tasks: A feedback control analysis
[AD-A012023] A76-11724

HUMAN REACTIONS
On the relation between time and space in the visual discrimination of velocity A76-10718

Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation A76-10720

On experts and expertise - The effect of variability in observer performance --- in coronary pathology analysis A76-11470

Alcohol and other drugs in aircraft accidents A76-11713

Effect of elastic loading on ventilatory response to hypoxia in conscious man A76-12097

Effect of altitude exposure on platelets A76-12098

Biochemical aspects of acclimatization of man to high altitude stress A76-12475

Report of the working party on standardization of the international research group on colour vision deficiencies [IZF-1975-7] A76-10708

HUMAN WASTES
M-071 critical data analysis [NASA-CR-145692] A76-11692

HYDRAZINES
Effects of monomethylhydrazine on red blood cell metabolism [AD-A011548] A76-10717

HYDROCARBON POISONING
Effects of monomethylhydrazine on red blood cell metabolism [AD-A011548] A76-10717

HYPERBARIC CHAMBERS
Reaction of erythrocytes and granulocytes in the peripheral blood of rate to hyperbaric oxygenation during oxygen deficiency in the organism A76-11238

Report on computation of repetitive hyperbaric-hypobaric decompression tables [NASA-CR-144560] A76-11714

HYPEROXIA
Oxygen and trauma: Studies on pulmonary oxygen poisoning and the role of oxygen in repair processes [AD-A011408] A76-10716

Effects of oxygen and reduced glutathione on the oxygen consumption of mouse liver [AD-A012172] A76-11717

HYPERTENSION
Hypertension --- pilot fitness A76-11473

Ocular hypertension and chronic open-angle glaucoma in USAF pilots and navigators [AD-A010588] A76-10720

HYPERTHERMIA
Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range [AD-A011484] A76-10714

Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range [AD-A011482] A76-10715

HYPOBARIC ATMOSPHERES
Report on computation of repetitive hyperbaric-hypobaric decompression tables [NASA-CR-144560] A76-11714

HYPOTHALAMUS
On the role of the hypothalamus in the mechanism of positional nystagmus A76-12213

HYPOXIA
DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions A76-10808

Reaction of erythrocytes and granulocytes in the peripheral blood of rate to hyperbaric oxygenation during oxygen deficiency in the organism A76-11238

Hemodynamic indicators in air personnel of varying ages A76-11920

Effect of elastic loading on ventilatory response to hypoxia in conscious man A76-12097

Changes in the oxygen tension and bioelectrical activity of the animal brain in acute hypoxia A76-12211

Microelectrode study of the distribution of oxygen tension in the brain A76-12212

The condition of the vascular net and the hemoencephalic barrier in the brain cortex of rats in the course of training for hypoxia A76-12216

Changes in peripheral vessels tone during acute hypoxia A76-12301

Effects of hypoxia on peripheral visual response to dim stimuli A76-12525

IMAGE INTENSIFIERS
The compromise between visual field and magnification for an image intensifier with variable magnification [IZF-1975-6] A76-10722

IMAGE TRANSDUCERS
The capability of fluoroscopic systems to determine differential Roentgen-ray absorption A76-11475

IMPACT LOADS
The anisotropy of compact bone material subject to impact loads A76-12559

IMPLANTED ELECTRODES (BIOLOGY)
Microelectrode study of the distribution of oxygen tension in the brain A76-12212

INDUSTRIAL SAFETY
Health hazard potential of HYPOL (trademark) polyurethane prepolymers [AD-A011997] A76-11721

INFECTIOUS DISEASES
Evaluation of early recognition of viral infections in man --- using specific gravity of lymphocytes [NASA-CR-144559] A76-11712

INFORMATION FLOW
The effect of time sharing on the performance of information processing tasks: A feedback control analysis [AD-A012023] A76-11724

INFORMATION MANAGEMENT
Analysis of human factors in aircraft accidents A76-11709

INFRARED FILTERS
Laboratory assessment of the AN/PVS-5 night vision goggle --- for infrared reconnaissance [AD-A011053] A76-10740

INHIBITION (PSYCHOLOGY)
Modulation of evoked responses during behavioral motor inhibition in the cat [AD-A011457] A76-10727

INJURIES
Ocular effects of laser radiation: Cornea and anterior chamber A76-11310

Ocular effects of radiation: Retina A76-11311

Determination of safe exposure levels: Energy correlates of ocular damage A76-11312

INTELLIGIBILITY
The effect of a tracking task on speech intelligibility in noise [RAE-TR-75014] A76-11729

INTERPLANETARY SPACECRAFT
Ecology and thermal inactivation of microbes in and on interplanetary space vehicle components [NASA-CR-145480] A76-10695

INTESTINES
Change in absorption and secretion functions of small intestine under the influence of rocking A76-12303

SUBJECT INDEX

MECHANICAL PROPERTIES

INTOXICATION

- Alcohol and other drugs in aircraft accidents
A76-11713
- Alcohol associated with fatal light aircraft
accidents, United Kingdom - 1964-1973
A76-11714
- Impaired pilot performance - Drugs or alcohol ---
aircraft accident medical investigation
A76-11716

ISCHEMIA

- Identification of ischemic heart disease --- pilot
fitness qualification
A76-11471
- Recommendations for subjects with ischemic heart
disease --- pilot standards
A76-11472

ISOCYANATES

- Health hazard potential of HYPOL (trademark)
polyurethane prepolymers
[AD-A011997] N76-11721

ISOTOPIC LABELING

- Cs-131 myocardial scintigraphy - Application to
assessment of anterior myocardial infarction
A76-10650

L

LAMINAR FLOW

- Reduction of the bacterial contamination by the
use of laminar flow in the construction of
cardiac valves
[NASA-TT-P-16643] N76-11708

LAMINATES

- Prototype cold weather headwear
[AD-A012314] N76-11732

LASEES

- Ocular effects of laser radiation: Cornea and
anterior chamber
N76-11310
- Determination of safe exposure levels: Energy
correlates of ocular damage
N76-11312
- Ophthalmological examination of laser workers and
investigation of laser accidents
N76-11315
- Laser protective devices
N76-11316

LEAVES

- Circadian rhythm of leaf movement in Capsicum
annuum observed during centrifugation
[NASA-CR-145614] N76-11705

LEG (ANATOMY)

- Analysis of changes in leg volume parameters, and
orthostatic tolerance in response to lower body
negative pressure during 59 days exposure to
zero gravity Skylab 3
[NASA-CR-144515] N76-10707

LEUKOCYTES

- Reaction of erythrocytes and granulocytes in the
peripheral blood of rate to hyperbaric
oxygenation during oxygen deficiency in the
organism
A76-11238

LIFE SCIENCES

- Integrated life sciences technology utilization
development program
[NASA-CR-144545] N76-11691

LIFE SUPPORT SYSTEMS

- Electrochemical air revitalization system
optimization investigation
[NASA-CR-144521] N76-10733

LIGHT (VISIBLE RADIATION)

- Ocular effects of radiation: Retina
N76-11311

LIGHT AIRCRAFT

- Alcohol associated with fatal light aircraft
accidents, United Kingdom - 1964-1973
A76-11714

LITHIUM BORATES

- Evaluation of lithium borate as a 7000-R dosimeter
[LA-5927-MS] N76-10699

LIVER

- Effects of oxygen and reduced glutathione on the
oxygen consumption of mouse liver
[AD-A012172] N76-11717

LOW PASS FILTERS

- The effect of a filtered control on operators'
hand tremor
[APRC-72/CS-7] N76-11723

LOW TEMPERATURE ENVIRONMENTS

- The performance and capabilities of terrestrial
organisms in extreme and unusual gaseous and
liquid environments. Performance of fungi in
exotic and harsh environments
[NASA-CR-145395] N76-10698

LUNG MORPHOLOGY

- Changes in the single-breath nitrogen washout
curve on exposure to 17,600 ft
A76-12099

LUNGS

- Oxygen and trauma: Studies on pulmonary oxygen
poisoning and the role of oxygen in repair
processes
[AD-A011408] N76-10716

M

MAGNIFICATION

- The compromise between visual field and
magnification for an image intensifier with
variable magnification
[IZF-1975-6] N76-10722

MAMMALS

- Microwave induced acoustic effects in mammalian
auditory systems
N76-11699

MAN MACHINE SYSTEMS

- Detection of a change in plant dynamics in a
man-machine system
A76-11064
- Analysis of human factors in aircraft accidents
A76-11709
- An investigation of single-axis manual control
processes and comparative evaluation of human
operator models
[PB-21] N76-10736
- Human force capabilities for operating aircraft
controls at 1, 3, and 5 GZ
[AD-A011545] N76-10739

MANIPULATORS

- Design and fabrication of an end effector
[NASA-CR-144008] N76-10735

MANNED SPACE FLIGHT

- Radiation safety in space flights: Radiobiological
aspects --- Russian book
A76-10303
- Future space exploration: An equal opportunity
employer? --- selection of women for spacecrews
[P-5492] N76-11706

MANUAL CONTROL

- Detection of a change in plant dynamics in a
man-machine system
A76-11064
- The effect of a filtered control on operators'
hand tremor
[APRC-72/CS-7] N76-11723

MARINE BIOLOGY

- Plankton analysis training manual
[PB-242008/1] N76-10700

MASKING

- Backward recognition masking --- human
psychoacoustics
A76-12337

MASKS

- Quantitative respirator man-testing and
anthropometric survey
[RFP-2358] N76-11728
- Visor system materials for aluminized firemen's
hoods. Report no. 1: Problem identification
[AD-A011420] N76-11731

MATHEMATICAL MODELS

- Mathematical description of the properties of
muscle tissue
A76-12552
- An investigation of single-axis manual control
processes and comparative evaluation of human
operator models
[PB-21] N76-10736
- A simulation of the human shoulder --- recoil from
rocket launchers
[AD-A012174] N76-11718

MECHANICAL PROPERTIES

- Theoretical study of some features of the dynamics
of the behavior of skeletal muscle as a
one-dimensional viscoelastic medium
A76-12557

MEDICAL ELECTRONICS

SUBJECT INDEX

Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject A76-12563

Morphological and functional aspects of studying some mechanical properties of the human aorta A76-12564

MEDICAL ELECTRONICS
Frequency analyzer for EEG signals A76-11200

MEDICAL PERSONNEL
On experts and expertise - The effect of variability in observer performance --- in coronary pathology analysis A76-11470

MEMBRANE STRUCTURES
Research on reverse osmosis membranes for purification of wash water at sterilization temperature (165 degrees F) [PB-242521/3] N76-11730

MEMORY
Molecular memory? [NASA-TT-F-16654] N76-11690

MENTAL PERFORMANCE
Change in brain blood circulation during mental activity A76-12302

METABOLISM
Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range [AD-A011484] N76-10714
Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range [AD-A011482] N76-10715

METHYL COMPOUNDS
Effects of monomethylhydrazine on red blood cell metabolism [AD-A011548] N76-10717

MICE
Effects of oxygen and reduced glutathione on the oxygen consumption of mouse liver [AD-A012172] N76-11717

MICROORGANISMS
Ecology and thermal inactivation of microbes in and on interplanetary space vehicle components [NASA-CR-145480] N76-10695

MICROWAVE FREQUENCIES
Experimental models for the evaluation of microwave biological effects A76-11844

MICROWAVE SCATTERING
Computation of the electromagnetic fields and induced temperatures within a model of the microwave-irradiated human eye A76-10997

MICROWAVES
Absorption characteristics of multilayered sphere models exposed to UHF/microwave radiation --- head tissue dosimetry phantom A76-10991

Radiation hazards [AGARD-LS-78] N76-11693

Pathophysiological aspects of exposure to microwave N76-11694

Endocrine and central nervous system effects of microwave exposure N76-11698

Microwave induced acoustic effects in mammalian auditory systems N76-11699

MILITARY OPERATIONS
Crew rest and nap-of-the-earth flying --- low altitude helicopter flight A76-11712

MINERALS
M-071 critical data analysis [NASA-CR-145692] N76-11692

MISSION PLANNING
The effects of extended missions on the performance of airborne command and control teams [AD-A011549] N76-10729

MODAL RESPONSE
Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation A76-10720

MOISTURE CONTENT
Space shuttle galley water system test program [NASA-CR-144531] N76-11726

MOLECULAR BIOLOGY
The deformation properties of contractile polymer structures Artificial muscles A76-12555

MOLECULAR STRUCTURE
Molecular memory? [NASA-TT-F-16654] N76-11690

MOTION
Vision from a moving car (no.1) [NASA-TT-F-16638] N76-11709

MOTION PERCEPTION
On the relation between time and space in the visual discrimination of velocity A76-10718
Perception and extrapolation of velocity and acceleration A76-10719

MOTION SICKNESS DRUGS
Stress modification of the toxicity of antimotion sickness drugs and Aspirin A76-12635

MOTION STABILITY
The effects of personal protective equipment upon the arm reach capability of USAF pilots [AD-A011580] N76-10738

MUSCLES
Mathematical description of the properties of muscle tissue A76-12552

MUSCULAR FUNCTION
Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal A76-10480
Governing law of statistical biomechanics A76-12554
The deformation properties of contractile polymer structures Artificial muscles A76-12555

MUSCULAR STRENGTH
Effect of a sequence of activating pulses on the contractile properties of muscle A76-12556
Designing for muscular strength of various populations [AD-A011537] N76-10737

MUSCULAR TONUS
Model of vascular tonus --- blood vessel mechanics A76-12553

MUSCULOSKELETAL SYSTEM
Effect of a sequence of activating pulses on the contractile properties of muscle A76-12556
Theoretical study of some features of the dynamics of the behavior of skeletal muscle as a one-dimensional viscoelastic medium A76-12557
Regulation of protein and amino acid degradation in skeletal muscle [AD-A011508] N76-10710

MYOCARDIAL INFARCTION
Cs-131 myocardial scintigraphy - Application to assessment of anterior myocardial infarction A76-10650
Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart A76-12162

MYOCARDIUM
Cardiomyopathy - The frequently forgotten mimic: Clinical and open-chest myocardial biopsy studies A76-11705
Measurement of regional myocardial blood flow in man Description and critique of the method using xenon-133 and a scintillation camera A76-12163

N

NEAR INFRARED RADIATION
Ocular effects of radiation: Retina N76-11311

NECK (ANATOMY)
Cervicocranium and the aviator's protective helmet --- hangman-noose-type fractures A76-11710

NEUROMUSCULAR TRANSMISSION

Governing law of statistical biomechanics
A76-12554
Effect of a sequence of activating pulses on the
contractile properties of muscle

Localization of 3H-gamma-aminobutyric acid in the
cochlea. Light and electron microscopic
autoradiography
[NASA-TT-F-16661] N76-11687

NEUROPHYSIOLOGY

Computer-aided analysis of the probability
characteristics of the brain biopotentials in
healthy man

The processing of a colored signal by various
types of ganglionic cells in the frog retina

Studies of orientational and postural mechanisms
in a model neural system
[AD-A012027] N76-11719

NIGHT VISION

Laboratory assessment of the AN/PVS-5 night vision
goggle --- for infrared reconnaissance
[AD-A011053] N76-10740

NITROGEN

Changes in the single-breath nitrogen washout
curve on exposure to 17,600 ft

M-071 critical data analysis
[NASA-CR-145692] N76-11692

NUTRITION

Starvation and refeeding of carp (*Cyprinus Carpio* L.)
[NASA-TT-F-16649] N76-10696
Fasting and renourishment of carp (*Cyprinus Carpio*
L.), 3
[NASA-TT-F-16651] N76-11686

O

OPERATOR PERFORMANCE

Detection of a change in plant dynamics in a
man-machine system

An investigation of single-axis manual control
processes and comparative evaluation of human
operator models
[PB-21] N76-10736

The effect of a filtered control on operators'
hand tremor
[APRC-72/CS-7] N76-11723

The effect of a tracking task on speech
intelligibility in noise
[RAE-TR-75014] N76-11729

OPHTHALMOLOGY

Ophthalmological examination of laser workers and
investigation of laser accidents

Optical communication
On the purpose of low-level vision
[AD-A012392] N76-11720

OPTIMIZATION

The compromise between visual field and
magnification for an image intensifier with
variable magnification
[IZF-1975-6] N76-10722

ORIENTATION

Studies of orientational and postural mechanisms
in a model neural system
[AD-A012027] N76-11719

ORTHOSTATIC TOLERANCE

Analysis of changes in leg volume parameters, and
orthostatic tolerance in response to lower body
negative pressure during 59 days exposure to
zero gravity Skylab 3
[NASA-CR-144515] N76-10707

OSMOSIS

Research on reverse osmosis membranes for
purification of wash water at sterilization
temperature (165 degrees F)
[PB-242521/3] N76-11730

OXIDATION

The dependence of the content and concentration of
products of enzymatic oxidation on the size of
coacervate droplets --- abiogenesis

A76-10809

OXYGEN CONSUMPTION

Effects of oxygen and reduced glutathione on the
oxygen consumption of mouse liver
[AD-A012172] N76-11717

OXYGEN MASKS

Respiratory resistance and the endurance of men
working under thermal stress
[AD-A011261] N76-10712

OXYGEN METABOLISM

What is the mechanism of carbon monoxide toxicity
A76-11717

OXYGEN PRODUCTION

Electrochemical air revitalization system
optimization investigation
[NASA-CR-144521] N76-10733

OXYGEN TENSION

Analysis of gases and pH of blood at altitude ---
inflight equipment calibration techniques
A76-11718

Changes in the oxygen tension and bioelectrical
activity of the animal brain in acute hypoxia
A76-12211

Microelectrode study of the distribution of oxygen
tension in the brain
A76-12212

P

PATHOLOGICAL EFFECTS

Reaction of erythrocytes and granulocytes in the
peripheral blood of rate to hyperbaric
oxygenation during oxygen deficiency in the
organism

Heart pathology associated with exposure to high
sustained +Gz
A76-11238

What is the mechanism of carbon monoxide toxicity
A76-11717

PATIENTS

Ophthalmological examination of laser workers and
investigation of laser accidents
N76-11315

PENICILLIN

The performance and capabilities of terrestrial
organisms in extreme and unusual gaseous and
liquid environments. Performance of fungi in
exotic and harsh environments
[NASA-CR-145395] N76-10698

PERFORMANCE TESTS

Quantitative respirator man-testing and
anthropometric survey
[RFP-2358] N76-11728

PERIPHERAL CIRCULATION

Reaction of erythrocytes and granulocytes in the
peripheral blood of rate to hyperbaric
oxygenation during oxygen deficiency in the
organism
A76-11238

PERIPHERAL VISION

Influence of foveal load on the functional visual
field

Effects of hypoxia on peripheral visual response
to dim stimuli
A76-12525

PH

Analysis of gases and pH of blood at altitude ---
inflight equipment calibration techniques
A76-11718

PHOSPHORUS METABOLISM

Chlorpromazine, piracetam, and the metabolism of
brain phospholipids in the rat
[NASA-TT-F-16652] N76-11688

PHYSICAL EXERCISE

Change in the functional state of the central
nervous system and the motor apparatus of
athletes under different conditions of activity
and rest
A76-12304

PHYSICAL WORK

The application of conductive cooling to human
operators
A76-12164

PHYSICIANS

Some particulars on the training of aviation
physicians
A76-11917

PHYSIOLOGICAL EFFECTS

SUBJECT INDEX

PHYSIOLOGICAL EFFECTS

Biomedical cost of low-level flight in a hot environment A76-11703

Body composition of mice following exposure to 4300 and 6100 meters A76-11704

Effect of altitude exposure on platelets A76-12098

Cellular viability, metabolism and growth kinetics during hyperthermia in the physiological range [AD-A011484] N76-10714

PHYSIOLOGICAL RESPONSES

Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress A76-11138

Experimental models for the evaluation of microwave biological effects A76-11844

Ernst Mach on the vestibular organ 100 years ago A76-12430

The pathophysiology of decompression sickness: An overview with emphasis on plasma and lipid changes [AD-A011153] N76-10711

PHYSIOLOGICAL TESTS

On the role of the hypothalamus in the mechanism of positional nystagmus A76-12213

Variations in psychomotor efficiency during prolonged stay at high altitude A76-12244

Change in absorption and secretion functions of small intestine under the influence of rocking A76-12303

Change in the functional state of the central nervous system and the motor apparatus of athletes under different conditions of activity and rest A76-12304

Report of the working party on standardization of the international research group on colour vision deficiencies [IZP-1975-7] N76-10708

PILOT ERROR

Medical and psychiatric aspects of accident investigation --- aviation pathology A76-11707

PILOT PERFORMANCE

Analysis of human factors in aircraft accidents A76-11709

Alcohol associated with fatal light aircraft accidents, United Kingdom - 1964-1973 A76-11714

Impaired pilot performance - Drugs or alcohol --- aircraft accident medical investigation A76-11716

Aviation audiometric lists A76-11919

SEEKVAL project IA1: Effects of target number and clutter on static target acquisition [AD-A011546] N76-10723

Evaluation of two link GAT-1 trainer tasks by experienced pilots at three alcohol dose levels [AD-A011607] N76-10725

The transition of experienced pilots to a frequency-separated aircraft attitude display: A flight experiment [AD-A001808] N76-10730

The effects of personal protective equipment upon the arm reach capability of USAF pilots [AD-A011580] N76-10738

The analysis of the pilot's cognitive and decision processes [NASA-CR-145739] N76-11722

PILOT SELECTION

Identification of ischemic heart disease --- pilot fitness qualification A76-11471

Valvular heart disease --- pilot qualification A76-11474

Future space exploration: An equal opportunity employer? --- selection of women for spacecrews [P-5492] N76-11706

PILOT TRAINING

Crew rest and nap-of-the-earth flying --- low altitude helicopter flight A76-11712

Training transfer of a formation flight trainer --- to aircraft formation flying A76-12165

PITUITARY GLAND

Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress A76-11138

PLANKTON

Plankton analysis training manual [PB-242008/1] N76-10700

PLANTS (BOTANY)

Water hyacinths for upgrading sewage lagoons to meet advanced wastewater treatment standards, part 1 [NASA-TN-X-72729] N76-10697

PLATELETS

Effect of altitude exposure on platelets A76-12098

POLYURETHANE RESINS

Health hazard potential of HYPOL (trademark) polyurethane prepolymers [AD-A011997] N76-11721

PRESSURE REDUCTION

Report on computation of repetitive hyperbaric-hypobaric decompression tables [NASA-CR-144560] N76-11714

PROGRAMMED INSTRUCTION

Practice and incentive effects on learner performance: Aircraft instrument comprehension task [AD-A011616] N76-10726

PROSTAGLANDINS

Prostaglandin control of renal circulation in the unanesthetized dog and baboon A76-10098

PROSTHETIC DEVICES

The deformation properties of contractile polymer structures Artificial muscles A76-12555

PROTECTIVE CLOTHING

The effects of personal protective equipment upon the arm reach capability of USAF pilots [AD-A011580] N76-10738

Laser protective devices N76-11316

Quantitative respirator man-testing and anthropometric survey [RFP-2358] N76-11728

Visor system materials for aluminized firemen's hoods. Report no. 1: Problem identification [AD-A011420] N76-11731

Prototype cold weather headwear [AD-A012314] N76-11732

PROTEIN METABOLISM

Measurements of lysosomal enzyme activities and laucine incorporation rates in the brains of young and old rats after applications of piracetam [NASA-TT-P-16653] N76-10704

Regulation of protein and amino acid degradation in skeletal muscle [AD-A011508] N76-10710

PSYCHIATRY

Medical and psychiatric aspects of accident investigation --- aviation pathology A76-11707

PSYCHOACOUSTICS

Backward recognition masking --- human psychoacoustics A76-12337

PSYCHOLOGICAL FACTORS

Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls A76-12562

PSYCHOLOGICAL TESTS

Effects of shifts in the rate of repetitive stimulation on sustained attention A76-12445

PSYCHOMOTOR PERFORMANCE

Variations in psychomotor efficiency during prolonged stay at high altitude A76-12244

Modulation of evoked responses during behavioral motor inhibition in the cat [AD-A011457] N76-10727

SUBJECT INDEX

SKYLAB PROGRAM

PSYCHOPHYSIOLOGY

Change in brain blood circulation during mental activity
A76-12302

PULMONARY LESIONS

Changes in the single-breath nitrogen washout curve on exposure to 17,600 ft
A76-12099

Q

QUALIFICATIONS

Hypertension --- pilot fitness
A76-11473
Valvular heart disease --- pilot qualification
A76-11474

R

RADIATION DOSAGE

Absorption characteristics of multilayered sphere models exposed to DHF/microwave radiation --- head tissue dosimetry phantom
A76-10991
Pathophysiologic aspects of exposure to microwave
N76-11694

RADIATION EFFECTS

Experimental models for the evaluation of microwave biological effects
A76-11844

RADIATION HAZARDS

Radiation safety in space flights: Radiobiological aspects --- Russian book
A76-10303
Radiation hazards
[AGARD-LS-78]
N76-11693
Biophysics - energy absorption and distribution
N76-11696

RADIO FREQUENCY HEATING

Computation of the electromagnetic fields and induced temperatures within a model of the microwave-irradiated human eye
A76-10997
Experimental models for the evaluation of microwave biological effects
A76-11844

RADIOBIOLOGY

Radiation safety in space flights: Radiobiological aspects --- Russian book
A76-10303
Application of radioimmunoassay techniques in support of toxicologic investigations of aircraft accidents
A76-11719

RADIOGRAPHY

Cs-131 myocardial scintigraphy - Application to assessment of anterior myocardial infarction
A76-10650

RADIOLOGY

X-ray investigation in aviation and space medicine
[NASA-TT-F-804]
N76-10705

RATS

Chlorpromazine, piracetam, and the metabolism of brain phospholipids in the rat
[NASA-TT-F-16652]
N76-11688

REACTION TIME

Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation
A76-10720

REBREATHING

Effect of elastic loading on ventilatory response to hypoxia in conscious man
A76-12097

REFLEXES

Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal
A76-10480
Dynamics of the skin-galvanic reflex for different stages and cycles of nighttime sleep
A76-11377

REINFORCEMENT (PSYCHOLOGY)

Evaluation of the energy expended in a learning situation (conditioning based on food reinforcement) by goldfish (*Carassius auratus* L.)
[NASA-TT-F-16650]
N76-11685

REMOTE CONTROL

Design and fabrication of an end effector
[NASA-CR-144008]
N76-10735

RENAL FUNCTION

Prostaglandin control of renal circulation in the unanesthetized dog and baboon
A76-10098

RESPIRATION

Respiratory resistance and the endurance of men working under thermal stress
[AD-A011261]
N76-10712
Toxic hazards research unit annual technical report, 1974
[AD-A011559]
N76-10718

RESPIRATORY RATE

Effect of elastic loading on ventilatory response to hypoxia in conscious man
A76-12097

RETINA

Two-point fluorophotometer for the human ocular fundus
A76-11419
Ocular effects of radiation: Retina
N76-11311

RETINAL IMAGES

The processing of a colored signal by various types of ganglionic cells in the frog retina
A76-12215

RHEOELECTRICAL SIMULATION

Electrical modeling of the blood circulation system
A76-12565

RHOENCEPHALOGRAPHY

Change in brain blood circulation during mental activity
A76-12302

RHEOMETERS

Multichannel rheograph with linear conversion characteristic and demodulation of pulsed blood filling at minimum probe current
A76-12305

RIBONUCLEIC ACIDS

Fasting and renourishment of carp (*Cyprinus Carpio* L.), 3
[NASA-TT-F-16651]
N76-11686

ROBOTS

Design and fabrication of an end effector
[NASA-CR-144008]
N76-10735

ROCKET LAUNCHERS

A simulation of the human shoulder --- recoil from rocket launchers
[AD-A012174]
N76-11718

S

SAFETY MANAGEMENT

Determination of safe exposure levels: Energy correlates of ocular damage
N76-11312

SEAT BELTS

Dynamic tests of a yielding seat and seat belt system for crash protection
[ARL/STRUC-358]
N76-11725

SEDATIVES

Chlorpromazine, piracetam, and the metabolism of brain phospholipids in the rat
[NASA-TT-F-16652]
N76-11688

SEMICIRCULAR CANALS

Ernst Mach on the vestibular organ 100 years ago
A76-12430

SEWAGE

Water hyacinths for upgrading sewage lagoons to meet advanced wastewater treatment standards, part 1
[NASA-TN-X-72729]
N76-10697

SHOULDERS

Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal
A76-10480
A simulation of the human shoulder --- recoil from rocket launchers
[AD-A012174]
N76-11718

SIGNAL MEASUREMENT

The capability of fluoroscopic systems to determine differential Roentgen-ray absorption
A76-11475

SKYLAB PROGRAM

SkyLab experiment M487 habitability/crew quarters
[NASA-TN-X-58163]
N76-11727

SKYLAB 3

Analysis of changes in leg volume parameters, and orthostatic tolerance in response to lower body negative pressure during 59 days exposure to zero gravity Skylab 3
[NASA-CR-144515] N76-10707

SLEEP
Dynamics of the skin-galvanic reflex for different stages and cycles of nighttime sleep A76-11377
Sleep-wakefulness determinations from heart rate data
[AD-A012275] N76-11716

SODIUM CHLORIDES
The performance and capabilities of terrestrial organisms in extreme and unusual gaseous and liquid environments. Performance of fungi in exotic and harsh environments
[NASA-CR-145395] N76-10698

SOLAR RADIATION
Heat stress in indigenous cattle --- solar radiation effects on east African zebu cattle (Bos indicus) N76-11647

SPACE FLIGHT FEEDING
M-071 critical data analysis
[NASA-CR-145692] N76-11692

SPACE FLIGHT STRESS
Biochemical aspects of acclimatization of man to high altitude stress A76-12475

SPACE FLIGHT TRAINING
Advanced crew procedures development techniques: Procedures and performance program training plan
[NASA-CR-144526] N76-10721
Advanced crew procedures development techniques: Procedures and performance program description
[NASA-CR-144517] N76-10734

SPACE PERCEPTION
On the relation between time and space in the visual discrimination of velocity A76-10718

SPACE RATINGS
Space shuttle galley water system test program
[NASA-CR-144531] N76-11726

SPACE SHUTTLES
Space shuttle galley water system test program
[NASA-CR-144531] N76-11726

SPACE SUITS
EV space suit gloves (passive)
[NASA-CR-144527] N76-10732

SPACECRAFT CABIN ATMOSPHERES
Cabin Atmosphere Monitoring System (CAMS), pre-prototype model development continuation
[NASA-CR-144005] N76-10731

SPACECRAFT CABINS
Skylab experiment M487 habitability/crew quarters
[NASA-TN-X-58163] N76-11727

SPACECRAFT ENVIRONMENTS
Experimental study of the constituents of space wash water
[NASA-CR-137735] N76-10706

SPACECRAFT STERILIZATION
Ecology and thermal inactivation of microbes in and on interplanetary space vehicle components
[NASA-CR-145480] N76-10695

SPACECREWS
Future space exploration: An equal opportunity employer? --- selection of women for spacecrews
[P-5492] N76-11706

SPEECH RECOGNITION
Aviation audiometric lists A76-11919

SPHYGMOGRAPHY
Inflight patient monitoring/blood pressure measurement device
[AD-A011608] N76-10713

SPLEEN
DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions A76-10808

STANDARDIZATION
Report of the working party on standardization of the international research group on colour vision deficiencies
[IZP-1975-7] N76-10708

STATISTICAL ANALYSIS

Computer-aided analysis of the probability characteristics of the brain biopotentials in healthy man A76-11376

Analysis of human factors in aircraft accidents A76-11709

STRESS (PHYSIOLOGY)
Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress A76-11138
The application of conductive cooling to human operators A76-12164
Stress modification of the toxicity of antinotion sickness drugs and Aspirin A76-12635
Respiratory resistance and the endurance of men working under thermal stress
[AD-A011261] N76-10712

STRESS (PSYCHOLOGY)
Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls A76-12562

STRESS CONCENTRATION
Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject A76-12563

SUNGLASSES
Effects of colored lenses on visual performance
[AD-A011572] N76-10728

SURFACE REACTIONS
The performance and capabilities of terrestrial organisms in extreme and unusual gaseous and liquid environments. Performance of fungi in exotic and harsh environments
[NASA-CR-145395] N76-10698

SWINE
Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart A76-12162

T

TABLES (DATA)

Report on computation of repetitive hyperbaric-hypobaric decompression tables
[NASA-CR-144560] N76-11714

TARGET ACQUISITION
SEEKVAL project IA1: Effects of target number and clutter on static target acquisition
[AD-A011546] N76-10723
SEEKVAL project IA1: Effects of color and brightness contrast on target acquisition
[AD-A011547] N76-10724
Effects of colored lenses on visual performance
[AD-A011572] N76-10728

TASKS
The effect of a tracking task on speech intelligibility in noise
[RAE-TR-75014] N76-11729

TECHNOLOGY UTILIZATION
Integrated life sciences technology utilization development program
[NASA-CR-144545] N76-11691

TEMPERATURE EFFECTS
Stress modification of the toxicity of antinotion sickness drugs and Aspirin A76-12635

TENSILE DEFORMATION
Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject A76-12563

THERMAL COMFORT
The application of conductive cooling to human operators A76-12164

THERMAL RESISTANCE
Ecology and thermal inactivation of microbes in and on interplanetary space vehicle components
[NASA-CR-145480] N76-10695

THYRUS GLAND

DNA synthesis in the lymphoid organs of rats
during adaptation to high-altitude conditions
A76-10808

TIME DISCRIMINATION

On the relation between time and space in the
visual discrimination of velocity
A76-10718

TIME SHARING

The effect of time sharing on the performance of
information processing tasks: A feedback
control analysis
[AD-A012023] N76-11724

TISSUES (BIOLOGY)

Absorption characteristics of multilayered sphere
models exposed to UHF/microwave radiation ---
head tissue dosimetry phantom
A76-10991

Mathematical description of the properties of
muscle tissue
A76-12552

Low-frequency acoustic characteristics of
biological tissues
A76-12561

Engineering considerations and measurements ---
electromagnetic field measurement in environment
and tissues after radiation exposure
N76-11701

TOXIC HAZARDS

Toxic hazards research unit annual technical
report, 1974
[AD-A011559] N76-10718

Health hazard potential of HYPOL (trademark)
polyurethane prepolymers
[AD-A011997] N76-11721

TOXICITY

Stress modification of the toxicity of antinotion
sickness drugs and Aspirin
A76-12635

TOXICITY AND SAFETY HAZARD

Toxicity of decomposition products
A76-10824

TOXICOLOGY

Comments on fire toxicity
A76-10823

A bibliography of published information on
combustion toxicology
A76-10825

Error and artefact in post mortem toxicological
analysis --- aviation autopsy material
contamination
A76-11715

Application of radioimmunoassay techniques in
support of toxicologic investigations of
aircraft accidents
A76-11719

Toxic hazards research unit annual technical
report, 1974
[AD-A011559] N76-10718

A review of the toxicology of halogenated fire
extinguishing agents
[AD-A011538] N76-11715

TRAJECTORY ANALYSIS

Dynamics of biped walk. II
A76-11451

TRANSFER OF TRAINING

Training transfer of a formation flight trainer
--- to aircraft formation flying
A76-12165

Intermodal transfer in temporal discrimination ---
of visual and acoustic stimuli duration
A76-12447

TREMORS

The effect of a filtered control on operators'
hand tremor
[APRC-72/CS-7] N76-11723

U

ULTRAHIGH FREQUENCIES

Absorption characteristics of multilayered sphere
models exposed to UHF/microwave radiation ---
head tissue dosimetry phantom
A76-10991

ULTRASONICS

Biological effects of ultrasound --- on human beings
N76-11700

V

VASCULAR SYSTEM

Pathological-anatomical studies involving vascular
stenoses
A76-11874

Model of vascular tonus --- blood vessel
mechanics
A76-12553

VASOCONSTRICTOR DRUGS

Prostaglandin control of renal circulation in the
unanesthetized dog and baboon
A76-10098

Interaction between pressor and depressor
mechanisms in the self-regulation of arterial
pressure
A76-12217

VASODILATION

Interaction between pressor and depressor
mechanisms in the self-regulation of arterial
pressure
A76-12217

VELOCITY

On the relation between time and space in the
visual discrimination of velocity
A76-10718

VENTILATION

Effect of elastic loading on ventilatory response
to hypoxia in conscious man
A76-12097

VERTEBRAL COLUMN

Fractures of the spine in helicopter accidents
(examination of 25 cases)
[RAE-LIB-TRANS-1848] N76-10703

VESTIBULAR NYSTAGMUS

On the role of the hypothalamus in the mechanism
of positional nystagmus
A76-12213

Rotatory and vertical components of the eye
nystagmus induced by rotation in a horizontal
plane
A76-12214

VESTIBULAR TESTS

Visual reaction times during prolonged angular
acceleration parallel the subjective perception
of rotation
A76-10720

Ways of further perfecting methods of vestibular
selection --- cumulative effects of Coriolis and
centripetal accelerations
A76-11918

VESTIBULES

Ernst Mach on the vestibular organ 100 years ago
A76-12430

Studies of orientational and postural mechanisms
in a model neural system
[AD-A012027] N76-11719

VIBRATION DAMPING

Determination of the elastic and damping
properties of the human femoral bone during
bending
A76-12558

VIBRATION EFFECTS

Study of the propagation of vibrations along the
human hip bone
A76-12560

VIDEO DATA

The capability of fluoroscopic systems to
determine differential Roentgen-ray absorption
A76-11475

VIRUSES

Evaluation of early recognition of viral
infections in man --- using specific gravity of
lymphocytes
[NASA-CR-144559] N76-11712

VISCOELASTICITY

Theoretical study of some features of the dynamics
of the behavior of skeletal muscle as a
one-dimensional viscoelastic medium
A76-12557

VISUAL ACUITY

SEEKVAL project IA1: Effects of target number and
clutter on static target acquisition
[AD-A011546] N76-10723

SEEKVAL project IA1: Effects of color and
brightness contrast on target acquisition
[AD-A011547] N76-10724

Vision from a moving car (no.1)
[NASA-TT-P-16638] N76-11709

VISUAL DISCRIMINATION

SUBJECT INDEX

VISUAL DISCRIMINATION

On the relation between time and space in the visual discrimination of velocity

A76-10718

Influence of foveal load on the functional visual field

A76-12446

VISUAL FIELDS

Influence of foveal load on the functional visual field

A76-12446

The compromise between visual field and magnification for an image intensifier with variable magnification
[IZF-1975-6]

N76-10722

VISUAL OBSERVATION

Human aspects of observation outside the space cabin
--- in-flight astronaut visual operative capacity

A76-12481

VISUAL PERCEPTION

Perception and extrapolation of velocity and acceleration

A76-10719

Apparatus for the combined study of the functions of the auditory and visual analyzers

A76-11921

Intermodal transfer in temporal discrimination --- of visual and acoustic stimuli duration

A76-12447

On the purpose of low-level vision

[AD-A012392]

N76-11720

VISUAL STIMULI

Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation

A76-10720

VISUAL TASKS

Effects of shifts in the rate of repetitive stimulation on sustained attention

A76-12445

Effects of hypoxia on peripheral visual response to dim stimuli

A76-12525

W

WAKEFULNESS

Sleep-wakefulness determinations from heart rate data

[AD-A012275]

N76-11716

WALKING MACHINES

Dynamics of biped walk. II

A76-11451

WATER

Experimental study of the constituents of space wash water

[NASA-CR-137735]

N76-10706

WATER DEPTH

Proceedings of the Undersea Medical Society Workshop (8th) on the Strategy for Future Diving to Depths Greater than 1,000 feet

[AD-A011456]

N76-10719

WATER POLLUTION

Plankton analysis training manual

[PE-242008/1]

N76-10700

WATER TREATMENT

Water hyacinths for upgrading sewage lagoons to meet advanced wastewater treatment standards, part 1

[NASA-TM-X-72729]

N76-10697

Research on reverse osmosis membranes for purification of wash water at sterilization temperature (165 degrees F)

[PE-242521/3]

N76-11730

WEIGHTLESSNESS

Analysis of changes in leg volume parameters, and orthostatic tolerance in response to lower body negative pressure during 59 days exposure to zero gravity Skylab 3

[NASA-CR-144515]

N76-10707

WORK-REST CYCLE

Change in the functional state of the central nervous system and the motor apparatus of athletes under different conditions of activity and rest

A76-12304

X

X RAY ABSORPTION

The capability of fluoroscopic systems to determine differential Roentgen-ray absorption

A76-11475

X RAYS

Evaluation of lithium borate as a 7000-R dosimeter
[LA-5927-MS]

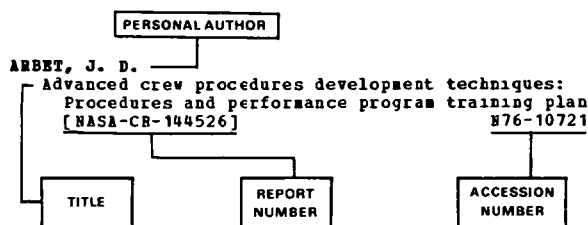
N76-10699

PERSONAL AUTHOR INDEX

AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Suppl 151)*

FEBRUARY 1976

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

- ABSALON, K. B.**
What is the mechanism of carbon monoxide toxicity
A76-11717
- AGASHIN, P. K.**
Governing law of statistical biomechanics
A76-12554
- AKOPIAN, M. S.**
Changes in the oxygen tension and bioelectrical activity of the animal brain in acute hypoxia
A76-12211
- AL-SADIR, J.**
Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart
A76-12162
- ALEXANDER, M.**
The effects of personal protective equipment upon the arm reach capability of USAF pilots
[AD-A011580]
N76-10738
- ALLUM, J. H. J.**
Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal
A76-10480
- AMSTERDAM, H. E.**
Recommendations for subjects with ischemic heart disease
A76-11472
- ANDERSON, I. H.**
Aviation cardiology in Canada
A76-11468
- ANTHOUDARD, M.**
Evaluation of the energy expended in a learning situation (conditioning based on food reinforcement) by goldfish (*Carassius auratus* L.)
[NASA-TT-P-16650]
N76-11685
- ARBET, J. D.**
Advanced crew procedures development techniques: Procedures and performance program training plan
[NASA-CR-144526]
N76-10721
- ARBET, J. D.**
Advanced crew procedures development techniques: Procedures and performance program description
[NASA-CR-144517]
N76-10734
- AUDET, M. F.**
Visor system materials for aluminized firemen's hoods. Report no. 1: Problem identification
[AD-A011420]
N76-11731
- AUPPRET, R.**
Fractures of the spine in helicopter accidents (examination of 25 cases)
[RAE-LIB-TRANS-1848]
N76-10703

B

- BACHEBACH, A. J.**
Human engineering considerations in the evaluation of diving equipment
[AD-A011680]
N76-10709
- BABYNS, D. A.**
Effects of oxygen and reduced glutathione on the oxygen consumption of mouse liver
[AD-A012172]
N76-11717
- BAILY, N. A.**
The capability of fluoroscopic systems to determine differential Roentgen-ray absorption
A76-11475
- BAKLAVADZHIAN, O. G.**
Changes in the oxygen tension and bioelectrical activity of the animal brain in acute hypoxia
A76-12211
- BARNETT, R. D.**
Analysis of changes in leg volume parameters, and orthostatic tolerance in response to lower body negative pressure during 59 days exposure to zero gravity Skylab 3
[NASA-CR-144515]
N76-10707
- BASKARAN, A. S.**
Variations in psychomotor efficiency during prolonged stay at high altitude
A76-12244
- BAUER, D. H.**
Studies of orientational and postural mechanisms in a model neural system
[AD-A012027]
N76-11719
- BEATRICE, E. S.**
Ocular effects of laser radiation: Cornea and anterior chamber
N76-11310
- BEATRICE, E. S.**
Ocular effects of radiation: Retina
N76-11311
- BELETSKII, V. V.**
Dynamics of biped walk. II
A76-11451
- BELIAKOV, R. V.**
The deformation properties of contractile polymer structures Artificial muscles
A76-12555
- BELL, H. H.**
On the relation between time and space in the visual discrimination of velocity
A76-10718
- BEN-SIRA, I.**
Two-point fluorophotometer for the human ocular fundus
A76-11419
- BENBOW, R. L.**
Advanced crew procedures development techniques: Procedures and performance program training plan
[NASA-CR-144526]
N76-10721
- BERINGER, D. B.**
The transition of experienced pilots to a frequency-separated aircraft attitude display: A flight experiment
[AD-A001808]
N76-10730
- BERLINER, D. S.**
Crew rest and nap-of-the-earth flying
A76-11712
- BERRY, M. R.**
Hypertension
A76-11473
- BETTS, M.**
Effect of elastic loading on ventilatory response to hypoxia in conscious man
A76-12097

BOETTCHER, D. B.
Prostaglandin control of renal circulation in the
unanesthetized dog and baboon A76-10098

BOLLINGER, R.
The effects of extended missions on the
performance of airborne command and control teams
[AD-A011549] N76-10729

BOLLINGER, R. R.
Biomedical cost of low-level flight in a hot
environment A76-11703

BOREISHA, I. K.
The processing of a colored signal by various
types of ganglionic cells in the frog retina
A76-12215

BORLAND, R. G.
Determination of safe exposure levels: Energy
correlates of ocular damage N76-11312

BOUCHE, G.
Fasting and renourishment of carp (*Cyprinus Carpio*
L.), 3
[NASA-TT-F-16651] N76-11686

BRATUS, V. V.
Changes in peripheral vessels tone during acute
hypoxia A76-12301

BRENNAN, D. H.
Ophthalmological examination of laser workers and
investigation of laser accidents N76-11315

BRESLER, V. M.
The condition of the vascular net and the
hemoencephalic barrier in the brain cortex of
rats in the course of training for hypoxia A76-12216

BRISTOW, MR.
Valvular heart disease A76-11474

BRODWIN, M. E.
Computation of the electromagnetic fields and
induced temperatures within a model of the
microwave-irradiated human eye A76-10997

BROOKS, H.
Biventricular dynamics during quantitated
anteroseptal infarction in the porcine heart
A76-12162

BROWN, A. H.
Circadian rhythm of leaf movement in *Capsicum*
annuum observed during centrifugation
[NASA-CR-145614] N76-11705

BROWN, J. R. C.
Cellular viability, metabolism and growth kinetics
during hyperthermia in the physiological range
[AD-A011484] N76-10714
Cellular viability, metabolism and growth kinetics
during hyperthermia in the physiological range
[AD-A011482] N76-10715

BRUCE, MR.
Identification of ischemic heart disease A76-11471

BRYAN, A. C.
Effect of altitude exposure on platelets A76-12098
Changes in the single-breath nitrogen washout
curve on exposure to 17,600 ft A76-12099

BRYANT, P. J.
Application of cabin atmosphere monitors to rapid
screening of breath samples for the early
detection of disease states
[NASA-CR-144548] N76-11713

BURGNET, W.
Cs-131 myocardial scintigraphy - Application to
assessment of anterior myocardial infarction
A76-10650

BURSACK, W. W.
Cabin Atmosphere Monitoring System (CAMS),
pre-prototype model development continuation
[NASA-CR-144005] N76-10731

BURTON, R. R.
Heart pathology associated with exposure to high
sustained +Gz A76-11706

BUSS, H.
Pathological-anatomical studies involving vascular
stenoses A76-11874

BUTRIAKOV, V. M.
Determination of the elastic and damping
properties of the human femoral bone during
bending A76-12558
Study of the propagation of vibrations along the
human hip bone A76-12560

C

CALLANEN, G. G.
Future space exploration: An equal opportunity
employer?
[P-5492] N76-11706

CAMPBELL, J. E.
Ecology and thermal inactivation of microbes in
and on interplanetary space vehicle components
[NASA-CR-145480] N76-10695

CANNON, P. J.
Measurement of regional myocardial blood flow in
man Description and critique of the method using
xenon-133 and a scintillation camera A76-12163

CARIS, MR.
Hypertension A76-11473

CARRE, R.
Fractures of the spine in helicopter accidents
(examination of 25 cases)
[RAE-LIB-TRANS-1848] N76-10703

CARROLL, D. R.
Analysis of changes in leg volume parameters, and
orthostatic tolerance in response to lower body
negative pressure during 59 days exposure to
zero gravity Skylab 3
[NASA-CR-144515] N76-10707

CARTER, MR.
Hypertension A76-11473

CARWELL, G. R.
Biomedical cost of low-level flight in a hot
environment A76-11703

CASARELLA, W. J.
Measurement of regional myocardial blood flow in
man Description and critique of the method using
xenon-133 and a scintillation camera A76-12163

CASTILLO-OLIVARES, J. L.
Reduction of the bacterial contamination by the
use of laminar flow in the construction of
cardiac valves
[NASA-TT-F-16643] N76-11708

CHACHENKO, G. E.
Change in the functional state of the central
nervous system and the motor apparatus of
athletes under different conditions of activity
and rest A76-12304

CHAPMAN, D. K.
Circadian rhythm of leaf movement in *Capsicum*
annuum observed during centrifugation
[NASA-CR-145614] N76-11705

CHAPMAN, R. P.
A bibliography of published information on
combustion toxicology A76-10825

CHEITLIN, MR.
Valvular heart disease A76-11474

CHERNOVA, I. V.
Mathematical description of the properties of
muscle tissue A76-12552

CHERTKOVA, E. S.
Reaction of erythrocytes and granulocytes in the
peripheral blood of rate to hyperbaric
oxygenation during oxygen deficiency in the
organism A76-11238

CHISUM, G. T.
Laboratory assessment of the AN/PVS-5 night vision
goggle
[AD-A011053] N76-10740

- CHOU, C. K.
Microwave induced acoustic effects in mammalian auditory systems
N76-11699
- CHUIKIN, A. E.
Microelectrode study of the distribution of oxygen tension in the brain
A76-12212
- COCKETT, A. T. E.
The pathophysiology of decompression sickness: An overview with emphasis on plasma and lipid changes [AD-A011153]
N76-10711
- COCKETT, W. S.
The pathophysiology of decompression sickness: An overview with emphasis on plasma and lipid changes [AD-A011153]
N76-10711
- COLANGIULO, E. J.
Cervicocranium and the aviator's protective helmet
A76-11710
- COLOMBO, G. V.
Experimental study of the constituents of space wash water
[NASA-CR-137735]
N76-10706
- CRAIG, P. H.
Respiratory resistance and the endurance of men working under thermal stress
[AD-A011261]
N76-10712
- CREACH, Y.
Starvation and refeeding of carp (*Cyprinus Carpio* L)
[NASA-TT-F-16649]
N76-10696
- CREPEAU, R. L.
The capability of fluoroscopic systems to determine differential Roentgen-ray absorption
A76-11475
- CROSSLEY, P. R. E.
Design and fabrication of an end effector
[NASA-CR-144008]
N76-10735
- CURRY, R. E.
The analysis of the pilot's cognitive and decision processes
[NASA-CR-145739]
N76-11722
- CZEHSKI, P.
Experimental models for the evaluation of microwave biological effects
A76-11844

D

- DAHL, A. O.
Circadian rhythms of leaf movement in *Capsicum annuum* observed during centrifugation
[NASA-CR-145614]
N76-11705
- DAVIS, T. Q.
Evaluation of two link GAT-1 trainer tasks by experienced pilots at three alcohol dose levels
[AD-A011607]
N76-10725
- DEAN, P. J.
Analysis of human factors in aircraft accidents
A76-11709
- DELAHAYE, R. P.
Fractures of the spine in helicopter accidents (examination of 25 cases)
[RAE-LIB-TRANS-1848]
N76-10703
- DEKCHENKO, I. T.
Microelectrode study of the distribution of oxygen tension in the brain
A76-12212
- DENSKI, L. S.
Studies of orientational and postural mechanisms in a model neural system
[AD-A012027]
N76-11719
- DETCHIEVA-MINOVA, Z.
Influence of Zsub 1210 cell growth of cells sterilized by ionizing radiations
[NASA-TT-F-16538]
N76-11689
- DGBUADZE, M. A.
Reaction of erythrocytes and granulocytes in the peripheral blood of rats to hyperbaric oxygenation during oxygen deficiency in the organism
A76-11238
- DIAMOND, P.
Health hazard potential of HYPOL (trademark) polyurethane prepolymers
[AD-A011997]
N76-11721
- DODGE, MR.
Identification of ischemic heart disease
A76-11471

- DODSON, J. D.
EV space suit gloves (passive)
[NASA-CR-144527]
N76-10732
- DOMINGUEZ, A. H.
Application of radioimmunoassay techniques in support of toxicologic investigations of aircraft accidents
A76-11719

E

- EDEL, P. O.
Report on computation of repetitive hyperbaric-hypobaric decompression tables
[NASA-CR-144560]
N76-11714
- EGOROV, I. A.
DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions
A76-10808
- EGSTROM, G. H.
Human engineering considerations in the evaluation of diving equipment
[AD-A011680]
N76-10709
- ELKINS, W.
EV space suit gloves (passive)
[NASA-CR-144527]
N76-10732
- ELLESTAD, MR.
Identification of ischemic heart disease
A76-11471
- ENGELKEN, E. J.
Evaluation of two link GAT-1 trainer tasks by experienced pilots at three alcohol dose levels
[AD-A011607]
N76-10725
- EVREIMOVA, T. H.
The dependence of the content and concentration of products of enzymatic oxidation on the size of coacervate droplets
A76-10809

F

- FAITELBERG, R. O.
Change in absorption and secretion functions of small intestine under the influence of rocking
A76-12303
- FARAND
Fractures of the spine in helicopter accidents (examination of 25 cases)
[RAE-LIB-TRANS-1848]
N76-10703
- FIGUERA, D.
Reduction of the bacterial contamination by the use of laminar flow in the construction of cardiac valves
[NASA-TT-F-16643]
N76-11708
- FINCH, V. A.
Heat stress in indigenous cattle
N76-11647
- FITZGIBBON, G. H.
Cardiomyopathy - The frequently forgotten mimic: Clinical and open-chest myocardial biopsy studies
A76-11705
- FLETCHER, R. G.
EV space suit gloves (passive)
[NASA-CR-144527]
N76-10732
- POWLER, D. L.
Measurement of regional myocardial blood flow in man. Description and critique of the method using xenon-133 and a scintillation camera
A76-12163
- FOX, MR.
Identification of ischemic heart disease
A76-11471
- FREEDMAN, M. H.
Effect of altitude exposure on platelets
A76-12098
- FREIS, MR.
Hypertension
A76-11473
- PROLOV, K. V.
Study of the propagation of vibrations along the human hip bone
A76-12560
- FROMME, H. G.
Localization of 3H-gamma-aminobutyric acid in the cochlea. Light and electron microscopic autoradiography
[NASA-TT-F-16661]
N76-11687

- FRYKHOLM, MR.
Recommendations for subjects with ischemic heart disease
A76-11472
- FUTIKOV, B. A.
The processing of a colored signal by various types of ganglionic cells in the frog retina
A76-12215

G

- GENSINI, MR.
Identification of ischemic heart disease
A76-11471
- GEORGE, M. E.
Effects of monomethylhydrazine on red blood cell metabolism
[AD-A011548] N76-10717
- GETMAN, F. P.
Multichannel rheograph with linear conversion characteristic and demodulation of pulsed blood flowing at minimum probe current
A76-12305
- GIFFORD, MR.
Hypertension
A76-11473
- GLADKII, G. V.
Change in absorption and secretion functions of small intestine under the influence of rocking
A76-12303
- GOLDBAUM, L. R.
What is the mechanism of carbon monoxide toxicity
A76-11717
- GOLDBERG, A. L.
Regulation of protein and amino acid degradation in skeletal muscle
[AD-A011508] N76-10710
- GOLDBERG, M.
Prototype cold weather headwear
[AD-A012314] N76-11732
- GONCHAR, M. S.
Apparatus for the combined study of the functions of the auditory and visual analyzers
A76-11921
- GOODWIN, A.
Stress modification of the toxicity of antimotion sickness drugs and Aspirin
A76-12635
- GOWEN, R. J.
Analysis of changes in leg volume parameters, and orthostatic tolerance in response to lower body negative pressure during 59 days exposure to zero gravity Skylab 3
[NASA-CR-144515] N76-10707
- GRAY, G. W.
Effect of altitude exposure on platelets
A76-12098
- Changes in the single-breath nitrogen washout curve on exposure to 17,600 ft
A76-12099
- GRIGOREV, I. U. G.
Radiation safety in space flights: Radiobiological aspects
A76-10303
- GUSEINOV, P. T.
DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions
A76-10808
- GUY, A. W.
Biophysics - energy absorption and distribution
N76-11696
- Microwave induced acoustic effects in mammalian auditory systems
N76-11699
- Engineering considerations and measurements
N76-11701

H

- HALL, MR.
Valvular heart disease
A76-11474
- HALLICK, T. M.
Electrochemical air revitalization system optimization investigation
[NASA-CR-144521] N76-10733

- HALSEY, M. J.
Proceedings of the Undersea Medical Society Workshop (8th) on the Strategy for Future Diving to Depths Greater than 1,000 feet
[AD-A011456] N76-10719
- HANNON, J. P.
Body composition of mice following exposure to 4300 and 6100 meters
A76-11704
- HARM, O. J.
On the relation between time and space in the visual discrimination of velocity
A76-10718
- HARPER, P.
Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart
A76-12162
- HARRIS, W. A.
Cabin Atmosphere Monitoring System (CAMS), pre-prototype model development continuation
[NASA-CR-144005] N76-10731
- HART, E. S.
Effects of colored lenses on visual performance
[AD-A011572] N76-10728
- HARTMAN, B. O.
The effects of extended missions on the performance of airborne command and control teams
[AD-A011549] N76-10729
- HEARN, M. D.
Dynamic tests of a yielding seat and seat belt system for crash protection
[ARL/STRUC-358] N76-11725
- HEGSTED, D. M.
M-071 critical data analysis
[NASA-CR-145692] N76-11692
- HENN, V.
Ernst Mach on the vestibular organ 100 years ago
A76-12430
- HENRY, P. H.
Evaluation of two link GAT-1 trainer tasks by experienced pilots at three alcohol dose levels
[AD-A011607] N76-10725
- HERING, F. J.
Measurements of lysosomal enzyme activities and laucine incorporation rates in the brains of young and old rats after applications of piracetam
[NASA-TT-P-16653] N76-10704
- HERING, H.
Measurements of lysosomal enzyme activities and laucine incorporation rates in the brains of young and old rats after applications of piracetam
[NASA-TT-P-16653] N76-10704
- HEYNDRIKX, G. B.
Prostaglandin control of renal circulation in the unanesthetized dog and baboon
A76-10098
- HICKLER, MR.
Hypertension
A76-11473
- HIGGINS, M. C.
Practice and incentive effects on learner performance: Aircraft instrument comprehension task
[AD-A011616] N76-10726
- HILADO, G. J.
A bibliography of published information on combustion toxicology
A76-10825
- HILGENDORF, R. L.
SEEKVAL project IA1: Effects of target number and clutter on static target acquisition
[AD-A011546] N76-10723
- SEEKVAL project IA1: Effects of color and brightness contrast on target acquisition
[AD-A011547] N76-10724
- HILL, C. E.
Biological effects of ultrasound
N76-11700
- HOFFMAN, E. F.
Electrophysiology and pharmacology of cardiac arrhythmias. II - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage. Part B
A76-11450
- HOLN, D. E.
Evaluation of lithium borate as a 7000-R dosimeter
[LA-5927-MS] N76-10699

- HOUSTON, C. S.
Effect of altitude exposure on platelets A76-12098
Changes in the single-breath nitrogen washout
curve on exposure to 17,600 ft A76-12099
- BOWE, R. C.
Modulation of evoked responses during behavioral
motor inhibition in the cat
[AD-A011457] N76-10727
- BULTGREEN, MR.
Valvular heart disease A76-11474
- BUMPHRIES, MR.
Identification of ischemic heart disease A76-11471

I

- IARTSEV, IU. A.
Morphological and functional aspects of studying
some mechanical properties of the human aorta
A76-12564
- IKEDA, M.
Influence of foveal load on the functional visual
field A76-12446
- ISABAEVA, V. A.
DNA synthesis in the lymphoid organs of rats
during adaptation to high-altitude conditions A76-10808
- IUGANOV, E. M.
Ways of further perfecting methods of vestibular
selection A76-11918
- IVANOV, V. V.
Ways of further perfecting methods of vestibular
selection A76-11918
- IVASHCHUK, A. G.
An evaluation of results of ergometric studies
[NASA-TT-F-16641] N76-11711

J

- JOHNSON, C. C.
Skylab experiment M487 habitability/crew quarters
[NASA-TN-X-58163] N76-11727
- JOHNSTON, H. E.
The effect of a tracking task on speech
intelligibility in noise
[RAE-TR-75014] N76-11729
- JUFFE, A.
Reduction of the bacterial contamination by the
use of laminar flow in the construction of
cardiac valves
[NASA-TT-F-16643] N76-11708

K

- KANDEL, MR.
Identification of ischemic heart disease A76-11471
- KARP, E. M.
Frequency analyzer for EEG signals A76-11200
- KASIANOV, V. A.
Differences between the deformation and strength
characteristics of large blood vessels depending
on their localization, load direction and age of
the human subject A76-12563
- KATALOV, M. I.
Aviation audiometric lists A76-11919
- KEISER, E. W.
Evaluation of two link GAT-1 trainer tasks by
experienced pilots at three alcohol dose levels
[AD-A011607] N76-10725
- KELTON, A. A.
Evaluation of early recognition of viral
infections in man
[NASA-CR-144559] N76-11712
- KHOMENKO, V. L.
An evaluation of results of ergometric studies
[NASA-TT-F-16641] N76-11711

- KERUST, IU. B.
The dependence of the content and concentration of
products of enzymatic oxidation on the size of
coacervate droplets A76-10809
- KINO, M.
Effects of age on responses to isometric exercise
- Isometric handgrip in noninvasive screening
for cardiovascular disease A76-11449
- KNOBBEL, MR.
Recommendations for subjects with ischemic heart
disease A76-11472
- KOBRICK, J. L.
Effects of hypoxia on peripheral visual response
to dim stimuli A76-12525
- KOCHUBEI, B. I.
Dynamics of the skin-galvanic reflex for different
stages and cycles of nighttime sleep A76-11377
- KOMOLOVA, G. S.
DNA synthesis in the lymphoid organs of rats
during adaptation to high-altitude conditions A76-10808
- KONDRATENKO, V. I.
Computer-aided analysis of the probability
characteristics of the brain biopotentials in
healthy man A76-11376
- KOPANEV, V. I.
Some particulars on the training of aviation
physicians A76-11917
- KOPCZYNSKI, H. D.
Inflight patient monitoring/blood pressure
measurement device
[AD-A011608] N76-10713
- KORIUKIN, V. E.
On the role of the hypothalamus in the mechanism
of positional nystagmus A76-12213
- KOTTAS, B.
On the relation between time and space in the
visual discrimination of velocity A76-10718
- KOUCHOUKOUS, MR.
Valvular heart disease A76-11474
- KRAMER, R. R.
A simulation of the human shoulder
[AD-A012174] N76-11718
- KRAUS, H.
Localization of 3H-gamma-aminobutyric acid in the
cochlea. Light and electron microscopic
autoradiography
[NASA-TT-F-16661] N76-11687
- KREGEERS, A. F.
Differences between the deformation and strength
characteristics of large blood vessels depending
on their localization, load direction and age of
the human subject A76-12563
- KRENDEL, E. S.
Detection of a change in plant dynamics in a
man-machine system A76-11064
- KROEMER, K. B. E.
Designing for muscular strength of various
populations
[AD-A011537] N76-10737
- Human force capabilities for operating aircraft
controls at 1, 3, and 5 GZ
[AD-A011545] N76-10739
- KRULWITZ, J. E.
Effects of shifts in the rate of repetitive
stimulation on sustained attention A76-12445
- KULBERTUS, H.
Cs-131 myocardial scintigraphy - Application to
assessment of anterior myocardial infarction A76-10650
- KURASHVILI, V. A.
Aviation audiometric lists A76-11919
- KUZNETSOV, V. S.
Aviation audiometric lists A76-11919

L

- LACONTI, A. B.
Research on reverse osmosis membranes for
purification of wash water at sterilization
temperature (165 degrees F)
[PB-242521/3] N76-11730
- LANCASTER, M. C.
Evaluation of two link GAT-1 trainer tasks by
experienced pilots at three alcohol dose levels
[AD-A011607] N76-10725
- LANCE, V. W.
Effects of age on responses to isometric exercise
- Isometric handgrip in noninvasive screening
for cardiovascular disease A76-11449
- LAPAEV, E. V.
Ways of further perfecting methods of vestibular
selection A76-11918
- LAPPIN, J. S.
On the relation between time and space in the
visual discrimination of velocity A76-10718
- LAUBACH, L.
The effects of personal protective equipment upon
the arm reach capability of USAF pilots
[AD-A011580] N76-10738
- LAWTON, M. B.
Evaluation of early recognition of viral
infections in man
[NASA-CR-144559] N76-11712
- LEIGH, J. D.
Quantitative respirator man-testing and
anthropometric survey [RFP-2358] N76-11728
- LEHESH, V. V.
Hemodynamic indicators in air personnel of varying
ages A76-11920
- LEVAKOVSKIY, P. L.
Change in the functional state of the central
nervous system and the motor apparatus of
athletes under different conditions of activity
and rest A76-12304
- LEVASHOV, M. M.
Rotatory and vertical components of the eye
nystagmus induced by rotation in a horizontal
plane A76-12214
- LEVIK, I. S.
Effect of a sequence of activating pulses on the
contractile properties of muscle A76-12556
- LEVY, M. B.
Identification of ischemic heart disease A76-11471
- LEWIS, W. P.
Effect of altitude exposure on platelets A76-12098
- LIKOFF, M. B.
Recommendations for subjects with ischemic heart
disease A76-11472
- LISEBRY, M.
Sleep-wakefulness determinations from heart rate
data [AD-A012275] N76-11716

M

- MACEWEN, J. D.
Toxic hazards research unit annual technical
report, 1974 [AD-A011559] N76-10718
- MACKENZIE, W. P.
Heart pathology associated with exposure to high
sustained +Gz A76-11706
- MALAISE, E. P.
Influence of Zsub 1210 cell growth of cells
sterilized by ionizing radiations
[NASA-TT-P-16538] N76-11689
- MALHOTRA, M. S.
Variations in psychomotor efficiency during
prolonged stay at high altitude A76-12244

- MANONTOVA, T. V.
The dependence of the content and concentration of
products of enzymatic oxidation on the size of
coacervate droplets A76-10809
- MANDERS, W. W.
Application of radioimmunoassay techniques in
support of toxicologic investigations of
aircraft accidents A76-11719
- MANGELSDORF, D.
Prototype cold weather headwear
[AD-A012314] N76-11732
- MANGIARACINA, A. A.
Advanced crew procedures development techniques:
Procedures and performance program description
[NASA-CR-144517] N76-10734
- MANKIN, M. B.
Identification of ischemic heart disease A76-11471
- MANNING, G. W.
Aviation cardiology in Canada A76-11468
- MANSUROV, A. B.
X-ray investigation in aviation and space medicine
[NASA-TT-P-804] N76-10705
- MARR, D.
On the purpose of low-level vision
[AD-A012392] N76-11720
- MARRA, C.
Stress modification of the toxicity of antinotion
sickness drugs and Aspirin A76-12635
- MARTZ, M. B.
Hypertension A76-11473
- MASHKOVSKIY, V. G.
Some hemodynamic indices at high altitude at rest
and after intense physical exercise
[NASA-TT-P-16639] N76-11710
- MASSARO, D. W.
Backward recognition masking A76-12337
- MATTSON, D. L.
Visual reaction times during prolonged angular
acceleration parallel the subjective perception
of rotation A76-10720
- MCALLISTER, M. B.
Valvular heart disease A76-11474
- MCDONALD, B. C.
Water hyacinths for upgrading sewage lagoons to
meet advanced wastewater treatment standards,
part 1 [NASA-TN-X-72729] N76-10697
- MCPADDEN, D. M.
Effect of altitude exposure on platelets A76-12098
- Changes in the single-breath nitrogen washout
curve on exposure to 17,600 ft A76-12099
- MCHENRY, M. B.
Identification of ischemic heart disease A76-11471
- MCHERKIN, M. B.
Recommendations for subjects with ischemic heart
disease A76-11472
- MCHERKIN, B. B.
Analysis of gases and pH of blood at altitude
A76-11718
- Coronary artery disease and preventive cardiology
in aviation medicine A76-11720
- MCHER, B. C.
Evaluation of two link GAT-1 trainer tasks by
experienced pilots at three alcohol dose levels
[AD-A011607] N76-10725
- MEIER, M. J.
Effects of oxygen and reduced glutathione on the
oxygen consumption of mouse liver
[AD-A012172] N76-11717
- MERCHIE, G.
Cs-131 myocardial scintigraphy - Application to
assessment of anterior myocardial infarction A76-10650

- MICHAELSON, S. M.**
Pathophysiological aspects of exposure to microwave
N76-11694
Endocrine and central nervous system effects of
microwave exposure
N76-11698
- MIKHAYEV, A. I.**
An evaluation of results of ergometric studies
[NASA-TT-F-16641]
N76-11711
- MILENSKI, J.**
SEEKVAL project IA1: Effects of target number and
clutter on static target acquisition
[AD-A011546]
N76-10723
SEEKVAL project IA1: Effects of color and
brightness contrast on target acquisition
[AD-A011547]
N76-10724
- MIRS, J. L., III**
Ocular hypertension and chronic open-angle
glaucoma in USAF pilots and navigators
[AD-A010588]
N76-10720
- MITCHELL, J. C.**
Electromagnetic radiation effects on the eye
N76-11697
Electromagnetic interference of cardiac pacemakers
N76-11702
- MONTGOMERY, R. R.**
Comments on fire toxicity
A76-10823
- MORRIS, MR.**
Recommendations for subjects with ischemic heart
disease
A76-11472
- MORWAY, P. E.**
Laboratory assessment of the AN/PVS-5 night vision
goggles
[AD-A011053]
N76-10740
- N**
- NARBONNE, J. P.**
Fasting and renourishment of carp (*Cyprinus Carpio*
L.), 3
[NASA-TT-F-16651]
N76-11686
- NEWELL, G.**
Effect of altitude exposure on platelets
A76-12098
- NIEMELA, R. J.**
Detection of a change in plant dynamics in a
man-machine system
A76-11064
- NIINIKOSKI, J.**
Oxygen and trauma: Studies on pulmonary oxygen
poisoning and the role of oxygen in repair
processes
[AD-A011408]
N76-10716
- NIKIFOROV, A. A.**
The condition of the vascular net and the
hemencephalic barrier in the brain cortex of
rats in the course of training for hypoxia
A76-12216
- NIKOLARV, A. G.**
Human aspects of observation outside the space cabin
A76-12481
- NOBLE, R. E.**
Helmets and head protection in CP ejections
1967-1973
A76-11711
- NOLAN, M. E.**
Research on reverse osmosis membranes for
purification of wash water at sterilization
temperature (165 degrees F)
[PB-242521/3]
N76-11730
- NOVIKOV, A. A.**
Multichannel rheograph with linear conversion
characteristic and demodulation of pulsed blood
filling at minimum probe current
A76-12305
- O**
- ODESSEY, R.**
Regulation of protein and amino acid degradation
in skeletal muscle
[AD-A011508]
N76-10710
- ODONWELL, R. D.**
The effects of extended missions on the
performance of airborne command and control teams
[AD-A011549]
N76-10729

- OHARA, H.**
Vision from a moving car (no.1)
[NASA-TT-F-16638]
N76-11709
- ORLADY, E. W.**
Operational aspects of pilot incapacitation in a
multicrew airliner
A76-11469

P

- PALTSER, E. I.**
Theoretical study of some features of the dynamics
of the behavior of skeletal muscle as a
one-dimensional viscoelastic medium
A76-12557
- PANOVKO, G. IA.**
Determination of the elastic and damping
properties of the human femoral bone during
bending
A76-12558
Study of the propagation of vibrations along the
human hip bone
A76-12560
- PAULEY, S. M.**
The pathophysiology of decompression sickness: An
overview with emphasis on plasma and lipid changes
[AD-A011153]
N76-10711
- PAYNE, R. J.**
Evaluation of lithium borate as a 7000-B dosimeter
[LA-5927-MS]
N76-10699
- PERRA, E. J.**
Reduction of the bacterial contamination by the
use of laminar flow in the construction of
cardiac valves
[NASA-TT-F-16643]
N76-11708
- PETTYJOHN, F. S.**
Coronary artery disease and preventive cardiology
in aviation medicine
A76-11720
- PFEIFFER, A.**
Molecular memory?
[NASA-TT-F-16654]
N76-11690
- PIROGOVA, O. IA.**
Change in the functional state of the central
nervous system and the motor apparatus of
athletes under different conditions of activity
and rest
A76-12304
- PLATT, D.**
Measurements of lysosomal enzyme activities and
laucine incorporation rates in the brains of
young and old rats after applications of piracetam
[NASA-TT-F-16653]
N76-10704
- POHRENTSEV, V. P.**
An evaluation of results of ergometric studies
[NASA-TT-F-16641]
N76-11711
- POTEMKIN, B. A.**
Determination of the elastic and damping
properties of the human femoral bone during
bending
A76-12558
Study of the propagation of vibrations along the
human hip bone
A76-12560
- PUTNAM, D. P.**
Experimental study of the constituents of space
wash water
[NASA-CR-137735]
N76-10706

R

- RAMIREZ, R. G.**
What is the mechanism of carbon monoxide toxicity
A76-11717
- RASHMAN, S. M.**
Change in brain blood circulation during mental
activity
A76-12302
- RASULOV, M. M.**
Interaction between pressor and depressor
mechanisms in the self-regulation of arterial
pressure
A76-12217
- BEEBUCK, A. S.**
Effect of elastic loading on ventilatory response
to hypoxia in conscious man
A76-12097

REGIERER, S. A.

PERSONAL AUTHOR INDEX

REGIERER, S. A.
Mathematical description of the properties of
muscle tissue
Model of vascular tonus
A76-12552
A76-12553

REID, G. B.
Training transfer of a formation flight trainer
A76-12165

REINHARDT, C. F.
Comments on fire toxicity
A76-10823

RESNEKOV, L.
Biventricular dynamics during quantitated
anteroseptal infarction in the porcine heart
A76-12162

REUSE, J. J.
Chlorpromazine, piracetam, and the metabolism of
brain phospholipids in the rat
[NASA-TT-F-16652]
N76-11688

REX, G. A.
Inflight patient monitoring/blood pressure
measurement device
[AD-A011608]
N76-10713

REYES, A. L.
Ecology and thermal inactivation of microbes in
and on interplanetary space vehicle components
[NASA-CR-145480]
N76-10695

RICH, B.
Biventricular dynamics during quantitated
anteroseptal infarction in the porcine heart
A76-12162

RICHARDSON, R. C.
Sleep-wakefulness determinations from heart rate
data
[AD-A012275]
N76-11716

RICHENBATH, W.
Localization of 3H-gamma-aminobutyric acid in the
cochlea. Light and electron microscopic
autoradiography
[NASA-TT-F-16661]
N76-11687

RICHTER, H.
Pathological-anatomical studies involving vascular
stenoses
A76-11874

RIVA, C.
Two-point fluorophotometer for the human ocular
fundus
A76-11419

ROBERTS, MR.
Recommendations for subjects with ischemic heart
disease
A76-11472

ROCHUS, L.
Chlorpromazine, piracetam, and the metabolism of
brain phospholipids in the rat
[NASA-TT-F-16652]
N76-11688

ROGERS, G. B.
Body composition of mice following exposure to
4300 and 6100 meters
A76-11704

ROSCOE, S. M.
The transition of experienced pilots to a
frequency-separated aircraft attitude display:
A flight experiment
[AD-A001808]
N76-10730

ROSEN, M. E.
Electrophysiology and pharmacology of cardiac
arrhythmias. IX - Cardiac electrophysiologic
effects of beta adrenergic receptor stimulation
and blockage. Part B
A76-11450

ROSENBAUM, D. A.
Perception and extrapolation of velocity and
acceleration
A76-10719

ROTENBERG, V. S.
Dynamics of the skin-galvanic reflex for different
stages and cycles of nighttime sleep
A76-11377

RUDNYI, N. M.
Some particulars on the training of aviation
physicians
A76-11917

RUTKEVICH, I. M.
Model of vascular tonus
A76-12553

RYBALOV, A. A.
Computer-aided analysis of the probability
characteristics of the brain biopotentials in
healthy man
A76-11376

S

SAPARASEVILI, G. A.
Study of the propagation of vibrations along the
human hip bone
A76-12560

SAKELLARIS, P. C.
Increased rate of response of the
pituitary-adrenal system in rats adapted to
chronic stress
A76-11138

SANTSCHI, H.
Prototype cold weather headwear
[AD-A012314]
N76-11732

SARRAILHE, S. R.
Dynamic tests of a yielding seat and seat belt
system for crash protection
[ARL/STRUC-358]
N76-11725

SARVAZIAN, A. P.
Low-frequency acoustic characteristics of
biological tissues
A76-12561

SAUNDERS, M. A.
Effect of elastic loading on ventilatory response
to hypoxia in conscious man
A76-12097

SCHMIDT, D. H.
Measurement of regional myocardial blood flow in
man. Description and critique of the method using
xenon-133 and a scintillation camera
A76-12163

SCHOENMACKERS, J.
Pathological-anatomical studies involving vascular
stenoses
A76-11874

SCHUBERT, P. H.
Electrochemical air revitalization system
optimization investigation
[NASA-CR-144521]
N76-10733

SCHWARTZ, J.
Biventricular dynamics during quantitated
anteroseptal infarction in the porcine heart
A76-12162

SCIACCA, R. R.
Measurement of regional myocardial blood flow in
man. Description and critique of the method using
xenon-133 and a scintillation camera
A76-12163

SERFATY, A.
Starvation and refeeding of carp (Cyprinus Carpio L.)
[NASA-TT-F-16649]
N76-10696

Fastig and renourishment of carp (Cyprinus Carpio
L.), 3
[NASA-TT-F-16651]
N76-11686

SETTLE, W.
Proceedings of the Undersea Medical Society
Workshop (8th) on the Strategy for Future Diving
to Depths Greater than 1,000 feet
[AD-A011456]
N76-10719

SHAHNATPOUR, A.
Effects of age on responses to isometric exercise
- Isometric handgrip in noninvasive screening
for cardiovascular disease
A76-11449

SHAKHNAROVICH, V. M.
Dynamics of the skin-galvanic reflex for different
stages and cycles of nighttime sleep
A76-11377

SHARMA, V. M.
Variations in psychomotor efficiency during
prolonged stay at high altitude
A76-12244

SHIELDS, D.
Stress modification of the toxicity of antimotion
sickness drugs and Aspirin
A76-12635

SHVARTZ, E.
The application of conductive cooling to human
operators
A76-12164

- SIEGEL, S. H.**
The performance and capabilities of terrestrial organisms in extreme and unusual gaseous and liquid environments. Performance of fungi in exotic and harsh environments
[NASA-CR-145395] A76-10698
- SIMABOVSKII, L. H.**
The condition of the vascular net and the hemoencephalic barrier in the brain cortex of rats in the course of training for hypoxia
A76-12216
- SINCLAIR, R. H.**
Plankton analysis training manual
[PB-242008/1] A76-10700
- SLINEY, D. H.**
Laser protective devices
A76-11316
- SMITH, E. B.**
Proceedings of the Undersea Medical Society Workshop (8th) on the Strategy for Future Diving to Depths Greater than 1,000 feet
[AD-A011456] A76-10719
- SOMIK, L. I.**
Change in absorption and secretion functions of small intestine under the influence of rocking
A76-12303
- SPODICK, D. H.**
Effects of age on responses to isometric exercise - Isometric handgrip in noninvasive screening for cardiovascular disease
A76-11449
On experts and expertise - The effect of variability in observer performance
A76-11470
- SRIVASTAVA, K. K.**
Biochemical aspects of acclimatization of man to high altitude stress
A76-12475
- STEIN, W.**
An investigation of single-axis manual control processes and comparative evaluation of human operator models
[PB-21] A76-10736
- STENLER, F. W.**
Respiratory resistance and the endurance of men working under thermal stress
[AD-A011261] A76-10712
- STOLBKOV, I. U. K.**
Rotatory and vertical components of the eye nystagmus induced by rotation in a horizontal plane
A76-12214
- STONER, D. L.**
Inflight patient monitoring/blood pressure measurement device
[AD-A011608] A76-10713
- STUCK, B. E.**
Ocular effects of laser radiation: Cornea and anterior chamber
A76-11310
- STUTZ, B. H.**
Intermodal transfer in temporal discrimination
A76-12447
- SUDAKOV, K. V.**
Interaction between pressor and depressor mechanisms in the self-regulation of arterial pressure
A76-12217
- SUHI, K.**
Toxicity of decomposition products
A76-10824
- SWAIN, J. A.**
Prostaglandin control of renal circulation in the unanesthetized dog and baboon
A76-10098
- SWEIGART, M. L.**
Health hazard potential of HYPOL (trademark) polyurethane prepolymers
[AD-A011997] A76-11721
- T**
- TAPLOVE, A.**
Computation of the electromagnetic fields and induced temperatures within a model of the microwave-irradiated human eye
A76-10997
- TAKEUCHI, T.**
Influence of foveal load on the functional visual field
A76-12446
- TENPAS, B. G.**
Practice and incentive effects on learner performance: Aircraft instrument comprehension task
[AD-A011616] A76-10726
- TEBRILL, J. B.**
Comments on fire toxicity
A76-10823
- THATCHER, R.**
Aviation cardiology in Canada
A76-11468
- THATCHER, R. F.**
Analysis of human factors in aircraft accidents
A76-11709
- TICKNER, P. G.**
EV space suit gloves (passive)
[NASA-CR-144527] A76-10732
- TREDICI, T. J.**
Ocular hypertension and chronic open-angle glaucoma in USAF pilots and navigators
[AD-A010588] A76-10720
- TRIEBWASSER, J. H.**
Evaluation of two link GAT-1 trainer tasks by experienced pilots at three alcohol dose levels
[AD-A011607] A76-10725
- TSAGARELI, Z. G.**
Reaction of erythrocytes and granulocytes in the peripheral blood of rats to hyperbaric oxygenation during oxygen deficiency in the organism
A76-11238
- TSATURIAN, A. K.**
Electrical modeling of the blood circulation system
A76-12565
- TSUCHIYA, Y.**
Toxicity of decomposition products
A76-10824
- TUBIANA, M.**
Influence of Zsub 1210 cell growth of cells sterilized by ionizing radiations
[NASA-TT-F-16538] A76-11689
- U**
- UDALOV, I. U. P.**
Change in absorption and secretion functions of small intestine under the influence of rocking
A76-12303
- UMHOLTZ, P. G.**
Design and fabrication of an end effector
[NASA-CR-144008] A76-10735
- UNDERWOOD GROUND, K. E.**
Alcohol associated with fatal light aircraft accidents, United Kingdom - 1964-1973
A76-11714
Impaired pilot performance - Drugs or alcohol
A76-11716
- USIK, P. I.**
Mathematical description of the properties of muscle tissue
A76-12552
Model of vascular tonus
A76-12553
- UTENKIN, A. A.**
The anisotropy of compact bone material subject to impact loads
A76-12559
- V**
- VALENTINE, J. L.**
Application of cabin atmosphere monitors to rapid screening of breath samples for the early detection of disease states
[NASA-CR-144548] A76-11713
- VALTHERIS, A. D.**
Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls
A76-12562
- VANLEEUWEN, R. E.**
The compromise between visual field and magnification for an image intensifier with variable magnification
[IZP-1975-6] A76-10722

- VANOS, P. L.
The compromise between visual field and magnification for an image intensifier with variable magnification
[IZP-1975-6] N76-10722
- VASSOLO, P. A.
Intermodal transfer in temporal discrimination A76-12447
- VATNER, S. F.
Prostaglandin control of renal circulation in the unanesthetized dog and baboon A76-10098
- VAVILOV, I. I.
Some particulars on the training of aviation physicians A76-11917
- VERNIKOS-DANELLIS, J.
Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress A76-11138
Stress modification of the toxicity of antineoplastic drugs and Aspirin A76-12635
- VERNOT, E. H.
Toxic hazards research unit annual technical report, 1974
[AD-A011559] N76-10718
- VOLKOVA, E. H.
Changes in peripheral vessels tone during acute hypoxia A76-12301
- VONSTEE, E. W.
A review of the toxicology of halogenated fire extinguishing agents
[AD-A011538] N76-11715
- VOROBEV, O. A.
Ways of further perfecting methods of vestibular selection A76-11918
- VORONIN, T. S.
Apparatus for the combined study of the functions of the auditory and visual analyzers A76-11921
- VOS, J. J.
Report of the working party on standardization of the international research group on colour vision deficiencies
[IZP-1975-7] N76-10708

W

- WARM, J. S.
Effects of shifts in the rate of repetitive stimulation on sustained attention A76-12445
Intermodal transfer in temporal discrimination A76-12447
- WATGOOD, M.
The effect of a filtered control on operators' hand tremor
[APRC-72/CS-7] N76-11723
- WEIL, C. M.
Absorption characteristics of multilayered sphere models exposed to UHF/microwave radiation A76-10991
- WEISS, M. B.
Measurement of regional myocardial blood flow in man: Description and critique of the method using xenon-133 and a scintillation camera A76-12163
- WELCH, A. J.
Sleep-wakefulness determinations from heart rate data
[AD-A012275] N76-11716
- WICKENS, C. D.
The effect of time sharing on the performance of information processing tasks: A feedback control analysis
[AD-A012023] N76-11724
- WILLIGES, B. C.
The transition of experienced pilots to a frequency-separated aircraft attitude display: A flight experiment
[AD-A001808] N76-10730

- WIT, A. L.
Electrophysiology and pharmacology of cardiac arrhythmias. IX - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage. Part B A76-11450
- WOHL, T. H.
Effects of shifts in the rate of repetitive stimulation on sustained attention A76-12445
- WOLCOTT, J. H.
Analysis of gases and pH of blood at altitude A76-11718
- WOLVERTON, B. C.
Water hyacinths for upgrading sewage lagoons to meet advanced wastewater treatment standards, part 1
[NASA-TM-X-72729] N76-10697
- WOODS, R. B.
Electrochemical air revitalization system optimization investigation
[NASA-CR-144521] N76-10733
- WOOTTON, D. G.
Error and artefact in post mortem toxicological analysis A76-11715

Y

- YANOWITZ, R. E.
Medical and psychiatric aspects of accident investigation A76-11707
- YOUNG, L. B.
Ernst Mach on the vestibular organ 100 years ago A76-12430

Z

- ZEHL, D. H.
The pathophysiology of decompression sickness: An overview with emphasis on plasma and lipid changes
[AD-A011153] N76-10711
- ZELLEN, A. F.
Alcohol and other drugs in aircraft accidents A76-11713
- ZHARKAIA, A. S.
Aviation audiometric lists A76-11919

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